1876

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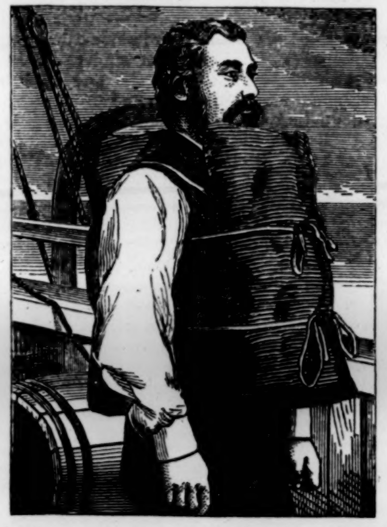

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JOURNAL OF THE INVENTORS' INSTITUTE.

NOVEMBER 1, 1875.

ADVANCEMENT OF KNOWLEDGE.

Although it is quite the fashion to advocate the extension of education everywhere and to everybody, as witness not only the zeal, but—if one may be allowed to so phrase it—the zealotism, with which the elementary education of the people under one intolerant doctrinaire system (for which, by-the-bye, a sufficient force of teachers, who must be of one pattern, are not to be had) is pressed forward by School Boards under the Education Act, regardless of the bodily injury inflicted upon the very poor who require the aid of their children in the battle of keeping the wolf from the door—the alternative being the denial of education or denial of food—to paraphrase a well-known line—

"Starving bodies whilst cramming minds,"

regardless, also, of the many different systems of instruction which may be resorted to—some suitable under one state of circumstances, some under another; and the fact that the idea that *quantum suf.* of book learning is necessary to usefulness in life, rests on a basis of lies, as proved by the lives and works of many men who, with little or no book learning, have done much for the advancement of civilization.

Yet with all this zeal for educating everybody, the advancement of real practical knowledge, that which has immediate reference to the things around us, receives but scant aid from anyone, not excepting the public Press, probably because it is very easy for any smatterer to dilate upon the importance of school book-learning as to which words—words—words—will suffice; whilst education as regards things would lead them into paths where their ignorance would cause them to stumble at every step. There is no doubt that much of this mistaken action in educational matters is the result of the attitude of the public Press, which gives but slight encouragement to the efforts of independent minds, there being very little which appears in the columns of the journals of the day, which is not written either by the staff or by those who are personally known to its members; so that public opinion is manufactured to order if possible.

Viewing this matter in the way we have stated, we were much pleased at receiving a communication setting forth some coincident ideas from a gentleman, who has given much attention to several important public questions—I. I. Gordon, D.C.L., author of papers on the improvement of the health of London, criminal jurisprudence, &c. As this gentleman takes a general survey of this important question, we now present his communication to our readers, with this reservation, that we do not intend to indorse all his statements or suggestions.

Dr. Gordon commences by stating his belief, "though there may not instantly be any menacing shadow upon us, of which we are unconscious, that the influence, if not the prosperity, of the future empire is to be forwarded by commensurate progress in science and the liberal arts, I have addressed a few lines to you on the subject of their advancement.

"1. I think this view would be promoted by a freer Press, indeed, freer literature generally. For example, the newspapers seem to be written by cliques of literary men, though it may not be so in fact. At any rate, the London journals should be more open to correspondence, so that the views of learned and scientific persons, who have no time to canvass for letters of introduction, may not be lost to the public. I believe there is less discussion of new ideas and inventions in them than there was some years ago, and also of weekly notices of doings of the learned associations.

"2. It is high time the public libraries were set about. Provincial people and colonists wonder why there are not half-a-dozen of the same and of mechanics' institutes in London. In Melbourne there is a public library of which Paris or Berlin might be proud; provided, too, with a gift of some handsome volumes from the late Emperor Napoleon. In its silent corridors numbers of diggers are reading all day long. They are valuable in affording a quiet sojourn, and also that working men may read and *litterateurs* study without ceremony. In connection with seven or eight public libraries or institutes there should be weekly lectures during the winter on subjects of taste and literature, history, and the development of this country; the lectures being selected by a committee from any applicants producing evidence of competency, which would be a useful co-operative measure, and afford a more graceful scope for the inclination displayed by so much stump oratory.

"3. The learned societies are surely to effect improvement beyond their fellows. Their papers and transactions are of course published in volumes, and there must be in this day of advanced education innumerable clever suggestions which are thus placed on the shelf. I dwell on the fact that general discussion would evolve remarkable results from them, and that a proportion of matter worth knowing, of new phenomena, inventions, and observations of travellers is banished after the day of reading or discussion. I believe this is the case even as regards the Geographical Society. Some remedy for the want of time would lie in Standing Committees of further consideration."

Dr. Gordon concludes by stating that in his view there is now so much advancement in knowledge amongst the working classes and persons of the humbler ranks of life that he considers it would be desirable to stimulate the upper classes by the institution of three or four Academies of the Liberal Arts in London, which should bring together for the advancement of learning members of the *noblesse*, and first-rate scholars of all ranks. This part of his communication we cannot coincide with. We think we have learned societies enough, which only require to be slightly confederated together, and a technological institute to be added, to do all that can usefully be done by societies.

Reviews.

SWINBURNE'S ESSAYS.

"Essays and Studies." By Algernon Charles Swinburne. Chatto and Windus.

In a volume of elegant language, and replete with poetical phrases, Mr. Swinburne has published his essays and studies, which he informs us were written at intervals during a space of seven years. In the re-issue of these he has made a valuable contribution to literature. Their first appearance caused a deal of cavil, especially his opinion of Byron and Coleridge. But Mr. Swinburne, always true to himself, assures us they are still his sincere and deliberate opinions. With a soul ever fervent, and a genius ever proud of its idol, he reviews a few of the past and present poets.

His essay in praise of Victor Hugo is extremely eulogistic, indeed, no man living, we think, could have a higher appeciation of his genius. Of "L'Homme qui Rit" he speaks as "a book to be rightly read, not by the lamplight of realism, but by the sunlight of his imagination reflected upon ours." And in a few lines full of poetical images he describes how only once in his life he has seen the likeness of Victor Hugo's genius.

Rossetti, Matthew Arnold, and Morris receive an equal share of praise; the two former are of the present school, but the latter—who has won for himself a name of no mean standing—has trod in the steps of the great father of English poetry, Chaucer. Mr. Swinburne says very truly, that, "over the first fortunes of a newly-born work of art accident must usually preside for evil or for good." And considers Morris's "Life and Death of Jason" "has not met with just praise," though he acknowledges it has "here and there met with earnest applause."

Of Shelley's genius too much cannot be said. And Mr. Swinburne has devoted his longest essay to him, "the greatest of lyric poets." His poetry is much mixed up with moral and political speculation, full of enthusiasm and rapturous passion, magnificent in imagery, one continuous chant filling the whole heavens!

Of Byron, he reminds us that "the most delicate and thoughtful of English critics has charged the present generation with forgetfulness of Byron," which is undoubtedly true, and we cannot think that statement improved by the following words of Mr. Swinburne:—"His sincerity indeed is difficult to discover and define; but it does in effect lie at the root of all his good works; deformed by pretension and debased by assumption, masked by folly and veiled by affectation." Byron stood alone in his generation, the prince of poets.

> "Eagles fly alone, but sheep are ever to be found in flocks."

We quite agree with Mr. Swinburne that "no poet is so badly represented as by a book of selections." But will he explain why he is so unjust to Byron as to say, "No poet of equal or inferior rank ever had so bad an ear. His smoother cadences are often vulgar and facile; his fresher notes are often incomplete and inharmonious. His verse stumbles and jingles, stammers and halts where there is most need for a swift and even pace of musical sound." This is a serious charge, and we want more than mere words to explain this. Why does Mr. Swinburne not give extracts in proof of this? Byron is one of our sweetest of lyrical poets: whether in *terza rima*, *ottava rima*, or *octosyllabic*. His *iambics* are perfection, and, indeed, all forms of stanza were accomplished by his masterly genius. In *blank verse* he was equally happy: his "Dream" is a poem of which Milton would have been proud. Mark the following, and the music of the alliteration:—

> "Our life is twofold: sleep hath its own world,
> And a boundary between the things misnamed
> Death and existence: sleep hath its own world,
> And a wide realm of wild reality;
> And dreams in their development have breath,
> And tears, and tortures, and the touch of joy.
> They leave a weight upon our waking thoughts,
> They take a weight from off our waking toils,
> They do divide our being; they become
> A portion of ourselves as of our time,
> And look like heralds of eternity.

Blank verse needs lines of such beauty as these of *ten syllables only* to elevate it above prose; and if the poets of this day were true to the text, it would find a much larger number of readers; but, alas! the age of poetry is over,

> "Lulled by the singer of an empty day."—
> (*Morris.*)

Mr. Swinburne's book throughout is written with an earnestness rarely met with, and the reader feels it is the work of an author whose soul is in his subject, himself a master of the art he endeavours to immortalize.

DR. LETHEBY ON NOXIOUS TRADES.

"On Noxious and Offensive Trades and Manufactures," with Especial Reference to the best Practicable Means of Abating the Several Nuisances therefrom. By H. Letheby, M.B., M.A., &c.; Professor of Chemistry in the College of the London Hospital; late Medical Officer of Health and Public Analyst for the City of London; President of the Society of Medical Officers of Health, &c. Reprinted, with additional matter, from "Public Health." London: Statham and Co., Palsgrave-place, Strand, W.C. 1875.

This pamphlet contains information of very great importance to those interested in sanitary questions, and also to many manufacturers; the author not being of those who think that all sorts of impossible restrictions should be placed upon our manufacturing industries, because some fidgetty old gentle man or fanciful fine lady is subjected to some little annoyance or unpleasantry, whilst he fully appreciates the necessity for suppressing those serious attacks upon public health, which are often made by manufacturers and others, who do not pay sufficient regard to the necessity of so conducting their operations as not to create unbearable nuisances in the localties wherein their factories or workshops are situated.

Nuisances are classified under three heads, namely:—

1st. Those which are caused by the escape of noxious or offensive effluvia, as gases and vapours.

2nd. Those which are produced by smoke, dust, or other mechanical impurities.

3rd. Those which are occasioned by the discharge of noxious or offensive matters into gutters, ditches, or watercourses.

And as to these Dr. Letheby states:—"Foremost of these operations which cause offence by the escape of sulphuretted hydrogen into the atmosphere is the manufacture of sulphate of ammonia from gas liquour. This liquour is produced in great quantity at the gas works—varying from ten to forty gallons per ton of coals, according to the strength of the liquor and the perfection of the processes for removing ammonia from gas. The strength of the liquor is estimated and expressed by its gravity in degrees of Twaddell, or by the number or ounces of strong sulphuric acid (sp. gr. 1,850) required to saturate a gallon of it. This varies from five or six ounces per gallon to twenty-five ounces, and according to my experience, the proportion of sulphuretted hydrogen contained in it ranges from 230 grains, or rather less than one-third of a cubic foot per gallon, to rather more than 1,250 grains, or nearly two cubic feet per gallon; so that the liquor is exceedingly offensive from the quantity or sulphuretted hydrogen contained in it; and therefore it is necessary to store it in air-tight tanks, and to transport it from place to place in air-tight vessels—as barrels or tank barges, or tank trucks. It is proper also that the orifices which give exit to the air at the time of filling the tanks should be guarded with a box or small barrel containing hydrated oxide of iron, which absorbs the sulphuretted hydrogen, producing sulphide of iron, which is quickly oxydized and revived by the action of the air.

The methods of treating this liquor with sulphuric acid so as to produce sulphate of ammonia have differed at different times and places. In my early experience, even in this metropolis the process was to neutralize the liquor with brown acid of specific gravity 1,720, and to convey the evolved gases into a furnace fire, as their escape into the air would be dangerous to the workmen; and the saturated liquor, still reeking with sulphuretted hydrogen, was evaporated in open leaden troughs over open fires. The nuisance arising from these operations was absolutely unbearable; and as people got to be more and more sensitive of annoyance, the old process was discontinued. At the present time the practice is to evaporate or distil the liquor from closed boilers or chambers, and to convey the volatile products—ammonia, carbonic acid, and sulphuretted hydrogen—into a closed chamber, or saturator, containing weak sulphuric acid, there being a contrivance for the escape of carbonic acid and sulphuretted hydrogen, and the conveyance of them to a furnace fire. In some cases the liquor is distilled from boilers set over a common fire; but, as this is liable to flushes and irregularity in working, it is objectionable, and has given place to the process of distilling by means of a steam coil set in the boiler, whereby steam at from twenty to thirty pounds pressure is blown into the liquor. But the best contrivance of all is that known as Coffey's still, which consists of a vertical chamber from twenty to twenty five feet in height, having a series of transverse septa which alternatively leave openings at their ends; and thus, with about sixty of such septa, a superficial area of about 1,000 square feet of evaporating surface may be obtained. The liquor is delivered in a constant and graduated stream at the top of the chamber, and as it flows backwards and forwards in a descending current over the transverse septa, it meets with an ascending blast of steam which is let into the bottom of the chamber at a pressure of from fifteen to thirty pounds. In this way the volatile constituents of the liquor are carried over to the saturator, when the ammonia is arrested by sulphuric acid, and the exhausted liquor flows out in a continuous stream from the bottom of the chamber. The saturator is generally an air-tight, leaden vessel, about four or five feet square and three or four feet deep, containing a charge of diluted sulphuric—equal parts of chamber acid (1,600) and water. When the acid is saturated with ammonia, which is known by test-papers, steam alone is blown into it from the still for about half an hour to displace all traces of sulphuretted hydrogen, and the solution is drawn off into open pans or troughs, where it is evaporated by means of a closed coil of high pressure steam set in the solution.

Another kind of saturator occasionally in use is a leaden vessel divided into two compartments by a diaphragm or curtain, which descends below the liquid to within about eighteen inches of the bottom. One of these compartments is closed air-tight and receives the volatile products of the still, where they meet with a graduated stream of brown acid (sp. gr. 1,720), which continually neutralizes them, and forms crystals of sulphate of ammonia, which are constantly ladled out of the open compartment. The apparatus is ingenious, and saves much labour and time in evaporation, as the acid is used in its undiluted condition; but it is not so certain or satisfactory in its action as the closed saturator before described.

In both cases the uncondensed gases—sulphuretted hydrogen and carbonic acid—with much steam, are conveyed from the saturator through a four-inch pipe to the furnace fire, where the sulphuretted hydrogen is burnt. It is necessary, however, that the sulphuretted hydrogen should be deprived of its moisture before it reaches the fire, or it will extinguish it; and this is effected by throwing the pipes into coils, or otherwise cooling it. The precautions, therefore, to be taken in the conduct of this business are:—

1st. The transport and storage of the gas liquor in air-tight tanks guarded with boxes of hydrated oxide of iron.

2nd. The distillation of the liquor in a steady and continuous manner in air-tight stills by means of high pressure steam.

3rd. The saturation of the ammonia in close vessels, and the complete expulsion of sulphuretted hydrogen from the saturated solution before it is drawn off for evaporation.

4th. The condensation of moisture from the sulphuretted hydrogen evolved from the saturator; and the conveyance of the cold dry gas to the furnace fire, where it is to be completely burnt.

5th. The treatment of the exhausted liquor from the still with cream of lime, so as to recover the residual ammonia by a second distillation; or, if the process be in operation at a gas works, the use of the residual ammonia as an absorbent in the purification of gas.

6th. The observance of the greatest care as regards the tightness of all parts of the apparatus.

Another operation which demands care in its management is the distillation of coal tar for the various products derivable from it. There are two kinds of tar obtained from coal, according as the temperature of distillation is high or low, and according to the richness of the coal in hydro-carbon. One is ordinary coal tar, and the other is the tar from which paraffin oils are obtained. The tar produced from common coals at a high temperature (common coal tar) is always heavier than water (sp. gr. 1,120 to 1,150); it drives freely in the air by oxidation; it contains hydro-carbons with such an excess of carbon that they cannot be burnt in a common lamp; it is almost entirely destroyed by strong oil of vitriol; it contains much sulphur, and its percentage composition is about eighty-six carbon, seven hydrogen, 6·5 oxygen, and 0·5 sulphur. Whereas the tar produced from cannel coal at a low temperature is lighter than water (sp. gr. about 900); it will not oxidate, or dry in the air; it contains hydro-carbons of the paraffin series which are comparatively poor in carbon, and which can be burnt in a lamp; it is not much acted on by oil or vitriol; it contains little or no sulphur; and its percentage composition is about eighty-four carbon, twelve hydrogen, and four oxygen. Both of these tars are the subjects of technical manipulation, and if not properly managed are the cause of nuisance, as are also the processes used in their primary production. In dealing with ordinary coal tar, it is proper that it should be stored and carried in air-tight tanks, and covered with a little water. The delivery of it into tank barges, or tank trucks, and from them into the tanks of the works, should be by means of pumps and air-tight, flexible hose; and the openings of the barges and tanks should be guarded with a box containing hydrated oxide of iron, as in the case of ammoniacal liquor.

Much is stated as to the proper treatment of these substances so as to avoid nuisance, and the following recommendations are given:—

1st. The transport and storage of the coal tar in air tight tanks or vessels guarded with boxes containing hydrated oxide of iron.

2nd. The proper construction of the primary receiver of the products of distillation, so that it may freely deliver them by special pipes to their respective receivers, and at the same time convey offensive non-condensible products to the scrubbers and purifiers.

3rd. The passage of the offensive non-condensible gases and vapours to a scrubber charged with a douche of cold water, then to an oxide of iron purifier, and finally to a tall chimney shaft.

4th. The proper cooling of the pitch in air-tight vessels before it is allowed to reach the external atmosphere, and the ventilation of these vessels through the scrubber and purifier before mentioned.

5th. The use of a fan or other exhausting power, so as to draw all the noxious gases and vapours from the stills, the pipes, the receivers, and the pitch den, into and through the scrubber and purifier before mentioned.

The production of paraffin oil from cannel coal, and the distillation of the crude tar, as well as the distillation of petroleum and Rangoon oil, requires like precautions, though not to the same extent, as the products are not nearly so offensive as in the case of coal tar products.

Many useful statements are made as to the distillation of oils and fats for the production of stearic, margaric, palmic, oleic, and other fatty acids, which is effected by means of sulphuric acid and super-heated steam; oil boiling, for making varnishes, linoleum, leather cloth, printers' ink, and black japan (a very disagreeable operation); varnish making and rosin distilling; fat melting, bone boiling, tripe dressing, and the cooking of sheeps' heads, bullocks' cheeks, livers, and feet, as well as the boiling of shell fish, lobsters and crabs; manure making; animal charcoal burning; and the roasting of coffee, chicory, and cocoa, if not properly managed.

In short, the whole question is succinctly and fully considered scientifically and practically, and we commend this little work to the attention of all interested in the matters of which it treats.

ALL THE WORLD OVER.

"All the World Over," Monthly Magazine of Travel, Incident, Legend, Research. Edited by Edwin Hodder, F.R.G.S. London: Thomas Cook and Son, Ludgate Circus; Hodder and Stoughton, Paternoster-row; New York: Cook, Son, and Jenkins, 261, Broadway.

This is a pleasant little serial, containing light, though interesting, articles, mostly illustrative of places of interest to tourists, though the first article is a continuation of a story called the "Love Chase," by Mr. T. Ambrose Heath; but to our taste the following article on "Vulgar Venice," by Mr. Horace St. John, is that most worthy of attention. We, therefore, give some extracts from this article.

It may not be a discovery, but it is a fact not often noticed, that there is an everyday Venice which is decidedly vulgar—which means that it is not all Rialto, Bridge of Sighs, Grand Canal, or Doge's Palace. But, to judge from poems, pictures, and tourists, the city is one beautiful dream, of marble and bronze, of jasper and vermilion, of pictures and the sculptors' breathing models. The temptation is, no doubt, seducing to pass all your time where the great columns stand, where the bronze horses, near St. Mark's, glow with all the colours of the sunset, and where that strangely-composed young girl shows you through the horrible labyrinths of the state prison.

Yet there is another Venice, which artists rarely touch, as if all low life were confined to the Low Countries, where they are eager enough to sketch fish stalls and kitchens, by the light of "single-candle," Scheudel. And this Venice has not a solitary element of romance or beauty about it. Step into the "omnibus gondola"—the very thought is enough to obliterate an epic of enthusiasm—and it will land you where the Venetians lead their common lives, without any Byron to bewail them. The songless gondoliers of these public boats are a miserable set of folk. They never save anything; their fathers never saved anything before them; but they keep up their spirits notwithstanding. Thus, between Giacomo passing Beppo "Good luck to you!" "Thanks!" "Be hanged, you and your thanks!" Or, "Many patrons?" "Many." "You, and your patrons be hanged!" These affectionate greetings are universal.

Some of the people keep stalls; others shops, without doors or windows. It appears odd to a stranger upon entering a wine-hall, to be offered a plate of highly-salted mutton, a comestible which everybody appears to be devouring. After it a service of fish, the entire flavour of which has been absorbed in brine. Then you are ready to drink; but the wine is salted also! There are two delicacies, however, in which persons of every degree delight, and which induce the denizens of the opulent quarter to bring their nobility here. The first is a small white biscuit, made of the most exquisite flour and fresh butter, so speckless, light, and fragile, that they crumble at a rough touch, and will not keep longer than twelve hours. Who wants to feast upon them, then, must come to the oven, and, tenderly handling the *bianchetti*, dip them in the wine of Cyprus, and believe in solid ambrosia. The second rarity—uniqueness, I would say, if there were such a word—is a little fish, fried in oil, which is sold from morning till night, all through the season. You shall see a maiden of Venice, gloved like a Parisian, "well-knotted," elegant of costume, and in air patrician, buy two pennyworth of these dainties—the whitebait of Italy—smelling of oil, fire, and the frying-pan, wrap them in paper, take them to a cabaret, sit down, and relish them unmistakably over a flask of Cyprus. She is never alone, however, but accompanied by an escort, who is stamped a gentleman by that sign infallible in Venice, whether or not it be so elsewhere—his dress. At the same table may be seated, possibly, the very fisherman who provided the banquet.

But what is the meaning of the phrase just used, "well-knotted"? Let her wear the richest silk ever spun in Italy, and the haughtiest Hungarian hat with aigrette of a dove's wing, your Venetian lady of blue blood is not distinguishable, except by what she has upon her neck. And this is a gold chain, of apparently countless links, beautifully brilliant, with that reddish tinge which has so often been the perplexity of painters, though Titian mastered it, as he did everything else; and falling from the throat, is gathered in a coil at the waist, where, the larger and heavier the knot, the higher the patent of social splendour.

Though I am not concerned at present

with the aristocracy of the sea-born city, still, if lofty dames will eat little fishes in a market-place, they cannot complain of personalities should the remark be made that some are dark as ever Giorgione or Carpaccio painted; while others, to borrow the ejaculation of a rapturous wanderer from Paris, who was not really in a rapture, and who, of course, did not mean what he was saying, might be mistaken for the daughters of Aurora, a contrast reminding you of Adam's two wives in the Talmud.

But Madame has finished her *gouter*, and, once more taking a liberty with my Frenchman, I remark that she "undulates" away with an appearance of perfect satisfaction. She will not be seen here again until the same freak of appetite seizes her. For, as a rule, the lower classes—as indeed they do everywhere — have their own neigbourhoods to themselves. Though in Venice, naturally, owing to the peculiarity of its position, there are subdivisions. The workmen, and artificers, and traders are quite distinct from the boatmen and fishermen, upon whom they look with contempt, and with whom they were formerly in a state of incessant feud. The former wear red caps and belts; the belts and caps of the latter are entirely either black or blue, the caps having tassels of the same colour, which give an oriental character to a Venetian crowd.

And here a curious point occurs. Your great lady prides herself upon the knot in her gold chain; your fisherman or ferryman wears a scarf round his neck, and the bigger the knot he can tie, the prouder is he of himself. Again, the gondoliers have their grades of rank. The lords of the black "water-broughams," as some one very much in want of a smart saying termed them, are in the service of private families, and hold themselves in readiness for orders, like coachmen. The second degree is composed, to carry on the analogy, of the canal cabmen, who live upon chance, upon travellers, and upon Romeos and Juliets, whenever these young persons are engaged in an adventure. Lastly, there are the gondoliers with fixed stations and fixed destinations, ferrymen who float to and fro. But they are all very important to Venice. They are the links of its life; for, singularly enough, it has not bridges enough, and, in this respect, is utterly unlike Amsterdam, with which it is so often and so absurdly compared. If, however, they swear at one another, they swear at the railway in a chorus. It is rarely, in these days, that any good luck befalls them. Now and then, to be sure, a music and singing party, dizzy with the juice of the Dalmatian grape, attempt to wake the echoes of Tasso among the lagoons, or two fond fools, fresh from their nuptials in the north, glide over the moonlit sea, regardless of expense, and look at life through the stars; yet such Jessica evenings are few and far between, and the Venetian gondoliers, seen by daylight, look like anything rather than Fennimore Cooper's hero, or even a daub in a Canaletti canvas. Still, his ancient art has not deserted him, and he can push his craft along at a wonderful speed. There is one peculiarity about them which the stranger does not readily understand. They speak as though their language were as limpid as the water on which they live, and made up almost entirely of vowels. You wish to be set ashore at the steps of the "Luna" hotel? certainly; your gondolier knows the "una" hotel perfectly well. He has another characteristic, not quite so uncommon—he is an unblushing cheat. His Venetian customer pays him tenpence, when you, being a stranger, must pay him half-a-crown, which is an Italian method of expressing patriotism, I suppose. Yet he is continually to be found upon his knees before the altar, and has a patron saint of his own, whom he invokes upon every necessary or unnecessary occasion.

GREGORY'S METRIC ARITHMETIC.

"British Metric Arithmetic." By Isaac Gregory, F.R.G.S. London: Cassell, Petter, and Galpin.

In these days there are few persons who do not readily admit that, as regards our weights and measures, we are behind the other countries of Europe who have adopted the metric system, still retaining, as we do, our own unsymmetrical standard; but the difficulty we conceive is, that if by Act of Parliament the metric system suddenly superseded the one we have always been used to, we should be plunged into something like complete chaos. Opponents of that system have urged this weighty objection, and with success. However, when, like the author of this work, any one seeks to show how the English weights and measures can with ease be converted into an approximation to the metric system, we cannot but agree that a uniform standard of weights and measures, extended over the whole civilised world, would be a great boon —with the reservation that, until people are educated to a change, we had better retain our present standard, which, comparatively speaking, is as correct as the metric, inasmuch as the foundation of the latter, viz., the "metre," is admitted to be incorrect in the length it is ascribed to be.

We consider, therefore, that the author of this work is doing an important and necessary work, by seeking to educate the people into the metric system; and, should it be eventually adopted in this country, though far remote the time may be, he will have helped forward its adoption, and we recommend all interested in the subject to peruse the work with careful consideration.

DR. ALLEYNE NICHOLSON ON ZOOLOGY.

"An Introductory Text-Book of Zoology." By H. Alleyne Nicholson, M.D., D.Sc., &c. Second Edition, Revised and Considerably Enlarged. William Blackwood and Sons, Edinburgh and London. 1875.

In this second edition of Dr. Nicholson's very useful work, complete revision and a considerable enlargement have been effected, though its general plan has been retained unaltered. The author has, as far as possible, relieved the somewhat dry details of which it is necessarily to a great extent made up, by the introduction of matter of a lighter sort, where this was at all practicable. He states that he had not found it possible, however, to add materially to the space devoted to the Vertebrata, without throwing the work out of proportion, and exceeding the limits laid down for it. He thinks this the less to be regretted, as any practical work undertaken by beginners in zoology will almost certainly lie in the department of the Invertebrata.

GANOT'S PHYSICS.

"Elementary Treatise on Physics." Translated and edited from Ganot's "Elements de Physique." By E. Atkinson, Ph.D., &c. London: Longmans, Green, and Co. 1875.

This is the seventh edition of the above well-known text-book. It is superfluous for us to declare the merits of the work, considering the fact that wherever the physical sciences are taught it is the text-book usually recommended as one of the best in existence. The additions in the present edition are seventeen new illustrations and twenty-seven pages of matter. These, the editor states, are given with the view, as in former editions, of rendering the book more useful for the student of physical science. A further addition by way of appendix contains a series of numerical problems and examples in physics, which students generally will doubtless find to be exceedingly valuable.

BRITTON ON TIMBER.

"A Treatise on the Origin, Process, Prevention, and Cure of Dry-rot in Timber: with Remarks on the Means of Preserving Wood from Destruction by Sea-worms, Beetles, Ants, &c." By Thomas Allen Britton, late Surveyor to the Metropolitan Board of Works, and Silver Medallist of the Royal Institute of British Architects, 1854, 1856, and 1870. London: E. and F. Spon, 48, Charing Cross. New York: 446, Broome-street. 1875.

The object of this very able practical treatise is to fully explain the nature and character of those well-known natural agencies which destructively affect timber, more especially the dry-rot as it is termed, and to afford remedial suggestions in regard thereto.

The comprehensive character of the work will be well understood by stating that the first chapter is on the nature and properties of timber, and then follow chapters—on the gradual rise and development of dry-rot; on felling timber; on seasoning timber by natural methods; on seasoning timber by patent processes, &c.; in which chapter a careful analysis is given of the different plans that have been brought under public notice from the year 1717 up to the present time, the first patent, however, appearing to have been taken out in 1837 by Mr. Emerson for a process of saturating timber with boiled oil mixed with poisonous substances, a process never much used. The remaining chapters are on the means of preventing dry-rot in modern houses, on the means of preservation of wooden bridges, jetties, piles, harbour works, &c., from the ravages of the *teredo navalis* and other sea-worms; on the destruction of woodwork in hot climates by the termite or white ants, woodcutter, carpenter bee, &c., and the means of preventing same; and on the cause of decay in furniture, &c., and the means of prevention.

After a careful perusal of this very interesting work, we fully believe that Mr. Britton is thoroughly justified in stating, as he does in his preface, that he has placed in as condensed a form as was consistent with the nature of the subject, the knowledge and information dispersed through a numerous collection of writers who have treated thereon; and has also availed himself of the assistance of professional friends, builders, timber merchants, foremen, and carpenters; and, by so doing, has been enabled to record several instances of the progress and cure of dry-rot; that he has consulted many valuable papers published during the last thirty years, in the various professional journals in England, America, France, and Germany, upon this important subject, and has also obtained much useful information from the works of Evelyn, Nicholson, Tredgold by Hurst, Papworth, Burnell, Blenkarn, and other English writers upon timber; Silloway, of North America; Porcher, of South America; Du Hamel, De Morny, and De Lapparent, of France; and several writers whose works are referred to. Further, that in preparing this treatise the aim has been to give a fair hearing to every patentee, and that he has been as impartial as could be fairly expected in recording instances of failure and success; and he states that if he has erred in any particular case, he will be happy, should this work reach a second edition, to make any necessary correction.

Modern authorities have been relied upon in preference to ancient ones; the following sentence, written by the late Sydney Smith, being quoted as a reason for so doing:—"Those who come first (our ancestors) are the young people, and have the least experience. We have added to their experience the experience of many centuries; and, therefore, as far as experience goes, are wiser, and more capable of forming an opinion than they were."

Independently of possessing the character

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of exhaustive research, the work is one of a most interesting character, and for a specimen of this we adduce the following passage, in which the proposition that *alum* could be beneficially used to impregnate timber in order to prevent decay, is referred to :—

In 1815, says our author, it occurred to Mr. Wade that it would be a good practice to fill the pores of timber with alumine; but two years after Chapman observed: "Impregnation of ships' timbers with a *solution of alum* occurred to me about twenty years since, because on immersion in sea water the alumine would be deposited in the pores of the timber; but I was soon informed of its worse than inutility, by learning that the *experiment had been tried*, and in place of preserving had *caused the wood to rot speedily*." Impregnation with *selenite* has been tried in elm water pipes. On precipitation from its solvent it partially filled the pores, and hardened the wood, but occasioned speedy rottenness. If by using a solution of alum to render wood uninflammable, we at the same time cause it *to rot speedily*, it becomes a question *whether the remedy is not worse than the disease*.

Captain E. M. Shaw, of the London Fire Brigade, in his work "Fire Surveys (1872)," recommends alum and water; probably he only thought of fire and not rotting wood. The alum question does not appear to be yet satisfactorily settled. While on the subject of unimflammable wood, we may state that in 1848 upon Putney Heath, near London, by the roadside, stood an obelisk to record the success of a discovery made in the last century of the means of building a house which no ordinary application of ignited combustible could be made to consume; the obelisk was erected in 1786. The inventor was Mr. David Hartley, to whom the House of Commons voted £2,500 to defray the expenses of the experimental building, which stood about one hundred yards from the obelisk. The building was three storeys high, and two rooms on a floor. In 1774 King George III. and Queen Charlotte took their breakfast in one of the rooms, while in the apartment below several fires were lighted on the floor, and various inflammable materials were ignited to attest that the rooms above were fire-proof. Hartley's plan consisted in the floors being double, and there being interposed between the two floors sheets of laminated iron and copper not thicker than stout paper, which rendered the floor airtight, and intercepted the ascent of the heated air; so that although the interior boards were actually charred, the metal prevented the combustion taking place in the upper flooring.

PRESTON ON PHYSICS OF THE ETHER.

"Physics of the Ether." By S. Tolver Preston. London: E. and F. Spon, 48, Charing Cross. New York: 446, Broome-street. 1875.

This work is a valuable contribution to scientific literature as regards that branch relating to physics, which of late years has made great strides towards effecting the general dissemination of knowledge of a department of science which technical men will always do well in cultivating.

It would be a task so difficult as to be nearly impossible to convey to the minds of our readers a full and faithful *exposé* of the contents of this little book (little only as regards size and number of pages); and we shall, therefore, content ourselves by quoting from the preface, which gives very fairly a brief *résumé* of the matter contained in the work:—

The present work, says the author, is intended to afford an explanation or insight into the mode of working of an important series of physical phenomena at present referred to the theories of "action at a distance" and "potential energy." The subject dealt with includes the general phenomena of the aggregation of molecules, at present referred to "cohesion," &c.; and the mutual—strikingly diversified—actions of dissimilar molecules, at present referred to "chemical affinity," including the remarkable development of molecular motion taking place in the phenomena of combustion and in the case of explosives, referred to "potential energy;" comprising also the movements of approach and recession of bodies in the "electric" condition (or when "statically charged") and the general effects comprised under the phenomena of "attraction and repulsion."

The first part of the work contains an argument designed to prove that the allied theories of "action at a distance" and "potential energy" (*i.e.*, the existence of two forms of energy, or an energy without motion) are inadmissible. The second part, or greater bulk of the work, is devoted to a consideration of the mode in which the above-named series of physical phenomena are brought about, or the regulating physical processes therein concerned. It is hoped that the arguments in the first part of the work will be received in the spirit in which they are written, *i.e.*, not in a captious spirit, but keeping in view the attainment of truth as the ultimate object.

COXHEAD'S PATENT HYDRAULIC GEAR FOR WATER-TIGHT DOORS ON BULKHEADS, &c.

Mr. Coxhead has for some years past been pondering on the desirability of providing more means of safety for our ships. He starts on the premiss that the ship itself should be rendered as nearly invulnerable as possible. Life-saving apparatus of one sort or other carried on board is all very well in its way, and is invented and introduced, and carried with the very best of intentions; but it has a very serious drawback—as a rule, it is all useless. Most things work beautifully in models on an office carpet, and some go so far as to work on a large scale when the ship is at anchor, or whilst on a passage down a river in smooth water. It is a very different thing when trouble arises at sea, where confusion reigns, and "presence" of mind is "absent." There is sure to be some hitch. The proper things are not at hand, or the proper men are absent, or probably occupied with other things; or, if everybody and everything can be found to work the contrivance—boat, raft, gimcrack, or whatever it is—the thing itself comes to grief in the attempt to launch it, or, if it survives the launching, turns over or gets stove in, or caves in completely. This is the case continually, and is not the exception. It is a debateable question whether ships would not be safer at sea if they were by law prohibited from carrying any boats or life-saving rattle-traps, beyond the boats necessary for putting out anchors, and a circular life-buoy or two to throw overboard to a man in the water. If the crew and all on board were to know that they have no chance of escape from fire or anything else, there would be few fires and few wrecks, for everyone on board would be an amateur detective, and there would be but little chance of look-out men going to sleep, of skippers neglecting the lead, or of crew and passengers getting amongst the cargo, and having, as was the case in the Cospatrick and other ships, a drink amongst inflammable and explosive stores. This all throws us back on the safety of the ship itself, and makes us think what can be done to render her more safe. There can be no doubt about the usefulness of bulkheads, if there are enough of them properly placed and properly fitted. They should be placed wherever convenient, and the more the better, so long as they can be placed without hindrance to the working of the ship. For convenience, it is necessary to provide doors of communication in some of those bulkheads. The great difficulty hitherto experienced is the closing of these doors upon an emergency. Somehow or other they are always left open and forgotten, or get jammed. This was very plainly and strikingly illustrated in the case of collision between the Ville du Havre and the Loch Earn, where, according to the evidence, the Ville du Havre was actually afloat for twenty minutes after the collision, and during this time the crew could not *close* the door in the bulkhead dividing the two chief compartments. If that door had been shut the ship would have been safe. As it was, a valuable ship and cargo, and many lives, were lost, and they were lost entirely through this one circumstance. Can something be produced that will be "dependable" in the hour of need — something that can be worked readily and easily, and prevent loss of life and treasure? It is to supply this need that Mr. Coxhead has introduced his apparatus. It is said to be simple and effective. It is said that a lad of twelve years of age can comprehend and work it. It is said to be always ready when wanted. It is said there is nothing about it to rust up or become fixed from neglect. It is said that the door can be closed at any desired speed, from two feet per second, without doing damage to the door, frame, or machinery. Upon its descent, it is said to be ready for raising again without repairs. The lift can be accomplished in about four minutes. The actual time occupied with the one fitted on board the imperial German ironclad Deutschland, is, in closing, fourteen seconds, and, in opening, three minutes and a half. That is fact. This door in the Deutschland can be closed more quickly if required. The door is six feet high by four feet wide, and weighs about nine hundredweight. It requires one lad only to work it. This speed is utterly impossible of attainment with the ordinary screw gear, either for closing or for opening. None of the good qualities of the screw gear are, we believe, sacrificed, whilst the Deutschland's door has the additional advantage of rapid closing and non-liability to get out of order.—*Nautical Magazine*, August, 1875.

EDMONDSON AND WADSWORTH'S NAIL IMPROVEMENTS.

These improvements relate more particularly to those kinds of nails which are used for application to the soles and heels of boots and shoes, either in the manufacture or repair thereof, for the purpose of giving increased durability to the soles and heels of those articles of wear, combined with extreme lightness and a cheap cost.

The invention is thus described in the specification:—

We construct nails according to our improvements by either casting or forging the same in the first instance (by preference casting and annealing the same), and forming the heads thereof with a bevel edge around their outer circumferences, and by preference we construct such heads thin and flat so as to present a large wearing surface. We also prefer to construct the same with a short and thin shank or spike. We then place the nails in a die press of suitable form, whereby the bevel edge of the head is, by means of pressure or a blow applied in any suitable manner, bent or forced over so as to form a sharp or feather edge round the outer edge of the head, such being formed in the direction of the shanks or spikes. It will be easily understood that when a nail, formed in manner described, is driven into the sole or heel of a boot or shoe, this sharp or feather edge will be forced into the leather, by which means the nail becomes partially embedded therein, and is less liable to come loose, or for the head to be broken off from the shank or spike.

We obtain these results to a greater degree by subjecting the shanks or spikes of such nails to a suitable mechanical process, whereby such shanks or spikes become corrugated, screw-threaded, milled, or grooved. This may be done either by placing the nails in suitable revolving milling apparatus, or by pressing such shanks or spikes in a die, either as a separate process or in combination with the former process of forming the feather edge.

The die for preparing nails in this manner may be either fitted in the ordinary fly or stamper presses, or may be worked by steam or other power by means of a travelling or revolving table, to which a number of dies, or portions thereof, are fixed. Any or all of such dies may be formed with a self-acting piston or pistons, or self-acting levers, whereby the nails after being operated upon may be ejected from the apparatus, so that it will be only necessary to feed the dies with nails for to be subjected to the above described process or processes.

THE WESTMINSTER AQUARIUM.

The society instituted for the purpose of establishing the Royal Aquarium and Summer and Winter Garden, which is rapidly filling up its list of fellows or members, has issued a brief statement of its plans and present position, from which we learn that the contract for its erection has been taken by the eminent contractors, Messrs. Lucas, the plans for which have been prepared by the society's architect, Mr. A. Bedborough, is now rapidly approaching completion, and will be thrown open to the public in December of this year. Its situation is, as stated, certainly unrivalled, being in the heart of London, facing Westminster Abbey and the Houses of Parliament, and being literally within a few minutes' walk of Charing Cross, St. James's-street, and Piccadilly. The society was incorporated to provide the metropolis with an Aquarium and Summer and Winter Garden, and in connection therewith, to afford facilities generally for the promotion and encouragement of artistic, scientific, and musical tastes.

The freehold site secured by the society on which the building is being erected, covers close on three acres, and running from the Broadway, Westminster, to the St. James's Park Station, has a frontage of some 600 feet. The main structure is 160 feet wide, whilst the promenade, or principal avenue, is eight feet wider than that of the Crystal Palace. The specification shows that 7,890 cubic yards of concrete, 6,000,000 of bricks, 483 tons of cast-iron, and 609 tons of wrought-iron, are to be used; and as a fact, almost the whole portion of these materials are in their places. The height from the floor to the level of the roof will be seventy-two feet. Galleries will extend all round the building, and will be forty feet in width. In these galleries will be located the picture and fine art exhibitions, and also a museum; beneath the galleries, and round the building itself, will be the aquarium, a special feature and novelty, being the first of its kind established in London; and no pains will be spared to render it at once the most complete and instructive aquarium in the world. The experience already gained in the construction and management of the Crystal Palace, Brighton, and Manchester aquaria will be fully utilised, and prove highly advantageous in the completion of the present enterprise. This will be placed under the supervision of Mr. W. A. Lloyd, the eminent naturalist.

The superficial feet of glass for the tanks will be just on 2,000 feet, and it will take over 140,000 gallons of water to fill them. Perhaps the best idea of the massiveness of the work is to be gained by going underground. Descending a ladder you find yourself in a large tunnel, lofty enough for a waggon of hay to pass through. It is like an ancient Roman cloaca. The foundation of it is four feet of concrete; next above that bricks; then Portland cement; then, next to your feet, asphalte. This last is used because it has been found that salt water acts upon cement, and in time causes a leak. This cloaca is divided into three sections, one of which will contain fresh water, the others salt water; and the stream flowing from these tanks being constantly oxygenised, is kept in continual circulation. Through these means the sea and fresh water will remain pure for years without change. Indeed, the water at the Crystal Palace, Hamburg, and Paris, has never as yet been changed, though these aquaria have been in existence many years.

The centre or main transept of the building is principally constructed of glass, forming a large conservatory and promenade, surrounded by galleries. In this it is proposed to hold a concert every afternoon and evening. Special and vocal concerts of an exceptionally high character will be held once a week.

The Executive Committee have great pleasure in announcing that Mr. Arthur Sullivan has accepted the post of conductor and musical director.

Throughout the season, flower shows, fancy fêtes, bazaars, &c., will be organised in the central hall, which will be peculiarly well adapted for these purposes. A picture and fine art gallery will also be opened; and to this department offers on loan from most influential quarters have already been made. In connection with the main building there will be rooms for private concerts and for the delivery of popular lectures on matters pertaining to science and art and other subjects of public interest. The rooms will be so arranged that artistic, literary, and private societies can engage them for the purposes of meetings, conversaziones, &c., &c. A reading and writing room, as well as a library, will also be opened for the use of visitors. The restaurant will be modelled partly on the French, partly on the English principle. The attendants will be in livery, as at the principal West-end clubs; and Messrs. Bertram and Roberts, whose names are in themselves a guarantee, will supervise this department.

The council of fellows comprises names well-known in the scientific, artistic, and fashionable world; and the Executive Committee will spare no pains to render the Royal Aquarium and Summer and Winter Garden the favourite resort of the scientific, fashionable, and artistic world.

MAYER'S SPIROMETER.

Dr. Henry Charles Mayer, of Pall Mall, has secured a patent for "improvements in the spirometer." This invention has for its object rendering the spirometer portable and specially useful for medical purposes. Dr. Mayer constructs a vessel made of any suitable material of measured capacity, say of about twenty-five cubic inches; connected to this vessel is a mercurial tube, which fits air-tight into the vessel, the mouth inside terminating in a corrugated metal top. A tube with mouth-piece is also connected to the vessel.

When using the instrument the person blows through the air tube, and, of course, in doing so, increases the pressure of the air inside the vessel, and the additional pressure acting on the mercury in the mercurial tube forces the mercury up the tube. The said tube is graduated so as to show the additional pressure, and also the amount blown into the vessel, so that the same will at once be seen by noting the height of mercury. To prove the correctness of the instrument, Dr. Mayer supplies a small pump, graduated by means of which air can be forced into the vessel in the quantity of from one cubic inch at one time up to any desired pressure. The pressure indicating the volume of air at any time can be seen.

Correction for increased temperature can be made as required. Any suitable form of mercurial tube may be used in connection with this instrument.

MARTINEAU ON SOUND.

"Chapters on Sound." For Beginners. By C. A. Martineau. London: The Sunday School Association, 37, Norfolk-street, Strand, W.C.

It has not been our fortune to peruse a work for beginners for some long time, on the subject of sound, treated in such a readable and yet scientific manner as the little work before us, and we deem it due to the author to say that the amount of information compressed into his book is far more than is contained in so many so-called books for beginners, which occupy at least two or three times the space of this work. In our opinion the author fully accomplishes his proposed object of teaching a few of the simple facts of acoustic science, in such a way that the learner shall have no unnecessary difficulties put in his way either by use of technical language or by having to provide himself with complicated apparatus. As regards the apparatus required for the experiments described, it is rather surprising to note that all the expense is covered by the outlay of two or three shillings.

Another feature is that two kinds of type are used, and passages in the smaller type being somewhat more difficult, the intention being that in case of young beginners these may be left out, and the remainder yet be intelligible. Our space does not permit of our giving quotations from this little work, which we cordially recommend as useful for beginners in the study of acoustics.

DESIGNS FOR VALVE GEARING.

"Designing Valve Gearing." By Edward J. Cowling Welch, M.I.C.E. London: E. & F. N. Spon, 48, Charing Cross.

Those persons occupied in designing machinery, especially valve gearing, will find this work very useful; and it will likewise be found useful to workmen desirous of acquiring more knowledge than the mere routine of how the parts are made and put together in the workshop.

The author of this work is conscious that the subject has before been treated by competent authorities, as Rankine, Zeuner, and others; but he appeals for justification of the publication of the present work to the fact that in the "getting out" of details of engine-work, the question of valve gearing is frequently the one which presents the greatest difficulty. The base of the problems worked out is similar to that propounded by Professor Zeuner, and the working out of the problems include all forms of slide valve gearing, in which motion is derived from eccentrics, and by further application of problems solved, figures for other combinations, the author asserts, are easily obtained.

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SIR ANTONIO BRADY.

SESSION 1875-76.

Thursday, Nov. 25th.—Opening Address of Session at 8; Council Meeting at 7 p.m.

N.B.—Members are specially invited to read Papers at the Members' Meeting during the Session.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts. F. W. CAMPIN, Sec.

Proceedings of the Institute.

A MEETING of the Executive Council was held on the 28th October, summoned by notice under the new rules. The consideration of the arrangements for the forthcoming Session occupied its attention. The programme, as settled, will be notified in due course.

It was decided that Members should be specially solicited to read Papers on their Inventions at the Members' Meetings.

Monthly Notices.

The Social Science Congress held its annual sitting during the past month at Brighton, under the presidency of Lord Aberdare. Schemes for social beatification were, as in former years, promulgated by various would-be improvers of our Ways of Life. Dr. W. B. Richardson sketched the plan of a new Utopia, under the name of Hygeia, in which all possible improved appliances for water and gas supply, sewerage, ventilation, and so forth, were to be adopted; intoxicating drinks and tobacco being banished from its bounds. We do not find that the important practical question of Patent Law Reform was the subject of consideration, and cannot point to any real practical work carried out by the Congress.

New Scientific Works are promised by Mr. Murray, namely: "Lessons from Nature as Manifested in Mind and Matter," by Mr. St. George Mivart. The same publisher has in the press a "Short History of Natural Science, and the Progress of Discovery from the Time of the Greeks to the Present Day," by Arabella Buckley; and Messrs. A. S. King and Co. are to publish an essay by Prof. Josiah P. Cooke, jun., the author of "The New Chemistry," a recently published volume of the International Scientific Series. It is on the subject of Scientific Culture. An English edition of Prof. E. L. Youman's Class-Book of Chemistry will be issued in a few days by the same publishers.

Investigations on Mariotte's Law of Air Pressures, made by M.M. Mendeléeff and Kirpitschoff, have been published in the Russian language, in an account of their experiments "On the Elasticity of Rarified Air." These tend to show that the law of Mariotte is not true for all pressures; but the investigations are going on.

Magnets have been artificially prepared by compressing iron filings in tubes; and, though the filings may be taken from soft iron—which does not exhibit any appreciable coercive force—yet when powerfully compressed by means of hydraulic pressure, the filings acquire a coercive power equal to that of steel. These magnets were submitted by Mr. Jamin to the French Academy of Sciences.

Mycographia is the title of a work, containing coloured illustrations of Fungi, being prepared for publication by Dr. Cooke. The first part will contain Geoglossum and Peziza (Humaria).

The Sub-Wealden Exploration (it is stated) is about to be renewed. The engineer has reported favourably on the possibility of completing the depth of 2,000 feet by attaching a crown to the 3-inch tubes, and after boring 1,824 feet to recommence with a 2½-inch crown. The Hon. Secretary, Mr. Willett, writes to the *Athenæum*:—"The Sub-Wealden Exploration is, therefore, awakened again into existence, and it hopes to bring to daylight the nature of deeper strata yet unknown. . . . . If a ridge of rocks be within 2,000 feet, we shall probably yet be able to announce its true place in the geological series."

At Bethnal Green Museum a collection is in formation, showing the application to industrial purposes of raw material, especially with reference to the economizing of matters formerly wasted.

The death of Sir Charles Wheatstone, in Paris, on Tuesday, the 19th ult., is announced. His name, jointly with that of Sir Fothergill Cooke, Vice President of the Inventors' Institute, is associated with the introduction of the electric telegraph and improved systems for using the electric current for communication purposes. Born in Gloucester in 1802, he had reached the age of seventy-three years. He was for many years Professor of Experimental Philosophy in King's College, London, a Fellow of the Royal Society, and LL.D. of the University of Edinburgh.

The discovery of another new small Planet has been announced by telegram received from America, making No. 149 of the group. The discovery was made by Prof. Watson on October 19th.

The New Observatory at Vienna will, says the *Athenæum*, be on a scale fully commensurate with the immensely increased needs of astronomical science. It is likely to be some years yet before the building is completed on the splendid scheme laid down, the plan of which was sanctioned in 1873. It is gratifying to learn that Messrs. Grubb, of Dublin, are constructing a magnificent refracting telescope for use in this observatory, which will equal, if not exceed, the largest at present in existence, it being intended that the object-glass shall be 26 or 27 inches in diameter, and its focal length 32 feet. The reputation of this firm (who have also, we believe, a commission to construct a first-class instrument for a new observatory to be erected at Potsdam, near Berlin) is a sufficient guarantee for the excellence of the telescope in question, for using which a site has been selected on the high ground of the Türkenschanze, so much better adapted for the purpose than Vienna itself, where the present observatory stands. Great part of the recent activity of this has been due, we should remark, to the Chief Assistant, Dr. Leopold Schulhof, and who we trust will have many opportunities of employing his scientific skill and ability in the future.

The Influence of Coloured Light on germination and on growing plants has been experimented on by Herr R. Weber. He finds that germination takes place soonest under dark blue glasses, a fact first noticed by Mr. Robert Hunt, and published by him in the *Philosophical Magazine* for 1840, a much fuller Report of the progress of the inquiry being published by the British Association in 1842. Some of the chemical changes effected in plants under the influence of the coloured rays observed by Herr R. Weber are certainly new.

Proceedings of Societies.

MICROSCOPICAL SOCIETY.

October 6th.—H. C. Sorby, Esq., President, in the chair.—Mr. J. B. Jones was elected a Fellow.—A number of presents to the Society were announced, and special attention was directed by the Secretary to a new turn-table by Mr. Cox, a new microscope exhibited by Mr. Beck, and a new form of hand magnifier by Mr. Browning.—Mr. Slack made some observations upon certain Lepidoptera armed with boring probosces by which they were said to pierce oranges and other fruits, and a comparison between drawings of an Australian species appeared to show that it was identical with one originally described by Mr. M'Intire, at the Society's meeting in April, 1874.—Mr. Beck exhibited a specimen of blood-discs obtained from a reptile (Amphiuma) received from the Mississippi river, and which were believed to be the largest in existence; they were, at the close of the meeting, shown under the microscope in contrast with those of human blood.—A papar, by Dr. Pigott, "On the Identical Characters of Spherical and Chromatic Aberration," was read by the Secretary.—Dr. T. Hudson gave a description of a new Melicertian, for which he proposed the name of *M. Tyro*, the subject being illustrated by a large number of diagrams.

SEA TELEGRAPHY IN SPECIAL RELATION TO THE LOSS OF THE VANGUARD.

Recently at the Manchester Scientific and Mechanical Society, Mr. W. H. Bailey read a paper on the above important subject. After referring to ancient beacons, and to other means of signalling hitherto adopted, he proceeds as follows:—

Hence it will be seen that telegraphs may broadly be divided into those which speak by sound, and those which speak by sight. In the first we may include guns, trumpets, gongs, and steam whistles, and in the latter flags, torches, lanterns, fires, semaphores, needles, and other instruments of a like character. We are chiefly concerned, however, with telegraphing by sound, of which I will now proceed to speak.

My attention was first drawn to this subject by Captain Brent, then commander of H.M.S. Bellerophon, and having made many experiments I have come to the conclusion that it is possible for vessels to speak each other in dense fogs, and under conditions at distances apart ranging from three miles up to at least six or eight, according to the conditions of the atmosphere. The experiments made by Dr. Tyndall in May, 1873, demonstrated the possibility of hearing a sound of a definite volume at distances varying from 3½ to 12¾ miles, according to the atmospheric conditions; but that on one occasion when the wind was against the sound it could be heard at a distance of 9¼ miles; and it is my object in the course of this paper, and with the aid of the experiments which are to follow, to show that the sound can be so utilised and directed as to almost literally talk. I may mention that the whistle on the table has been made from the patterns that I prepared for the Trinity House experiments on sound, conducted at Dover, by Professor Tyndall. I believe that it was there demonstrated that steam horns were better than whistles. I may be permitted, however, to observe that these horns cost exactly 5½ times more money than the whistles, and I have a strong impression that if the cost of both had been equal, the verdict would have been otherwise. It seems from this that making a noise in the world is simply a financial problem after all.

To speak first of vessels at sea, it may be said that the most dangerous conditions under which a vessel can move are such as prevailed recently upon the occasion of the Vanguard disaster. As dense fogs invariably occur in calm weather it will be apparent that sound telegraphs can be used with the greatest facility when there is most serious occasion for their services. I hope I shall be able to prove to you that it is perfectly possible and comparatively easy for one man to speak to another at, say, a speed varying from ten to twenty, and even up to thirty words per minute, according to distance. The instrument which I propose to use is a large steam whistle so designed that a pianoforte touch will give a large opening to the steam way, and enable a percussive short or long sound to be emitted. The diagram on the wall shows a sectional view of my patent steam whistle telegraph. It will be observed that the centre spindle has upon it two equilibrium valves, which are so balanced as to be effected by the lever with the greatest ease, even though there may be a pressure of eighty or a hundred pounds to the square inch on the valve faces. This arrangement makes it possible for large whistles to be worked whose supply pipes may be three, four, five, or six inches in diameter. The bell of the whistle is adjustable in order that high or low pressure steam may be used, and the best results be thus obtained from the steam that the boiler may carry when it is at work. This steam whistle I propose to elevate about ten or twelve feet above the head of the operator, who by means of a chain attached to the lever, and a handle, can work it and send messages by means of the dot and dash system, using either the Morse or any other code or alphabet. I prefer the Morse code for what appear to me sufficiently weighty reasons. In the first place, this code is already in use wherever the electric telegraph system is known. Every telegraphic instrumentalist in this country, in France, America, Russia, India, Germany, or anywhere else, uses this alphabet. And further, it is fortunate that this alphabet can be either written, seen, or heard. This peculiarity is particularly serviceable in this instance, and I wish specially to draw attention to the universal adoption of the Morse code, because if this system of signalling is to be introduced, to be of real service, it must be international, in order that the vessels sailing under all flags may be able to use it with mutual benefit. This fact enables us to see that a staff already educated is immediately available. I have made experiments in various parts of this country, and have on three separate occasions obtained the services of young men from the postal telegraph stations in the towns in which I have happened to be, and they have instantly understood the dot and dash sound telegraphy, and have been able to use my small instruments without any previous practice at all. I have not been able to make experiments of a thoroughly definite nature on long distances to ascertain as to how far sound may be sent by one of these instruments, but I believe that one of twelve inches diameter is quite capable of being used successfully through a fog for a distance of six miles. That is to say, that should two vessels get separated in a fog they would be able to communicate with each other, supposing them both to be provided with 12 inch whistles, even should they be six miles from one another. But I have made definite experiments with whistles six inches in diameter, and by one of that power sound may be distinctly heard and interpreted over a distance of three miles.

I exhibit a cast iron plate having the Morse alphabet in raised characters upon it. This I would place immediately below the telegraph whistle, so that anyone wishing to send a message, though he should not understand the alphabet, might yet do so readily by reference to the table. And those not technically acquainted with the system might easily master it. I am told by those connected with electric telegraphs in this country that a sharp lad can commit this alphabet to memory in two days; that it takes a dull lad four or five days, and a man from a week to a fortnight, according to his capacity.

The utility of such a system as this is at once apparent when the circumstances under which the late collision between the Iron Duke and the Vanguard took place are remembered. The Trinity House regulations at present are that during a fog every steam vessel must whistle under certain conditions: but the whistle is unintelligible—or, at least, unintelligent—and indicates only very obscurely the whereabouts of the vessel blowing the whistle. In fact, if anyone will shut his eyes, and listen to a steam whistle, he would find it extremely difficult to tell whether it was before or behind him. The want of this definite information was lamentably manifested in the recent collision. But if both vessels had been fitted with such instruments as I have described, they would not only have heard the whistle, but at the comparatively short distance which separated them they could have carried on a conversation, could have asked of each other the direction in which each was going, the rate of speed, or, in short, almost anything at all. Thus it will be at once seen how invaluable such a provision would have been.

Although I use the Morse code in order to show to-night the velocity with which telegrams may be sent, it is possible that codes already in use in the navy for flash-light purposes may be better than the Morse alphabet. Naval men will be the best judges of this if the instruments are practically tried. At the conclusion of my remarks, any of you who will write a short sentence may have it telegraphed into this room from an instrument twelve inches in diameter, which is fixed on a boiler a few hundred yards from the building, and thus some idea of the time taken to send information may be gained.

There are also small instruments on the table which we will use for sending messages from one room to another.

It has been proposed by Mr. Swann that whistles should be sounded by the revolutions of a drum, like an organ barrel, and driven by a small engine. A stereotyped international code could be continually sounded in a fog, indicating the exact course of the vessel. Mr. Swann and I have endeavoured to bring his invention into use at a great cost to ourselves, but it is obvious that this system would be useless unless made compulsory by the authorities.

But although I have so far called special attention to the utility of my system in foggy weather, it must have been apparent that it would be quite as useful under more favourable conditions. By this means, indeed, news could be communicated from one vessel to another as fast as a man could write, and with much greater facility than under the condition of things now prevailing. A vessel coming from a distant quarter of the globe meeting another, and having important intelligence to communicate may do so by simply diminishing her speed, and no time need be wasted while boats are being sent with letters. What a great boon this would be to the newspaper press in general may be readily understood, when it is borne in mind that the most that it is possible to obtain from outward bound vessels are a few brief items of intelligence very hurriedly composed, whereas by this system all need for hurry is abrogated. As soon as the vessels got within hearing distance the communication could be commenced, and in the course of an hour very nearly a column of latest news could be transmitted — that is to say, supposing twenty words were sent per minute, 1,200 words would be sent in the hour, and that number is not far short of what appears in the Manchester papers morning by morning in the latest news columns.

Mr. Bailey concluded by referring to various advantages claimed for the system referred to, remarking that it was often useful to our mercantile marine as well as the navy.

ORMSON'S IMPROVED BOILER AND HOT-WATER APPARATUS.

Mr. Henry Ormson, of Stanley Bridge, Chelsea, Middlesex, the eminent horticultural builder and hot-water apparatus engineer, has recently secured a patent for "improvements in hot-water apparatus and boilers for heating the same, said boilers being also applicable to other uses," which he described as relating to a divisional, or a single, double, treble, and quadruple system of heating by hot-water apparatus, its object being to afford the power of heating, say, one-quarter, one-half, three-fourths, or the whole of the apparatus, according to the arrangement and number of pipes or other appliances used, and by this means effect a great saving of fuel when only a part of the apparatus is used, the water in the other parts remaining quite cold, according to the state of the weather and temperature required in the various buildings to be warmed, such as churches, mansions, courts of law, public and private buildings of all descriptions, conservatories, hothouses, greenhouses, and horticultural buildings of every description.

A circulating box, either open or closed, is used, capable also of answering for a supply and feed cistern, this arrangement doing away with other feed cistern, pressure pipe, stop cocks, or valves, hose pipe, force pump, and bucket, though these can be used.

The boiler and furnace Mr. Ormson prefers to be of the construction which he thus describes:—I have a small boiler, or, when desired, a boiler furnished with a water-jacket, forming thereby in effect a double boiler, made either of wrought or cast iron, or any other description of metal, and I prefer to use the form of a dome, and within the space covered thereby to have the furnace and fire-chamber; said form of boiler being constructed so that the stoke-hole and deep setting required for ordinary boilers may be dispensed with, which is one great desideratum affected by my said invention; and I prefer also that the boiler be arranged so as to rest on a level with the floor line of the building or buildings required to be heated, such boiler to have one or more dip parts or legs for receiving the return water, such dip parts being either formed with the boiler or made separate and connected to same, and also making the boiler in one, two, or more parts. But what I consider particularly desirable are the leg or legs, or dip part or parts, of the boiler as used in connection with my said divisional hot-water apparatus herein described. In this boiler and furnace I can use any available description of fuel, lime, chalk, coal, coke, wood, peat, and so forth.

The details of an apparatus which will often be found useful are these:—I have expansion and pressure pipes, with circulating box, which is fed from a feed cistern. A stop cock or valve is used for stopping off the water from the pressure pipes abovementioned. The pressure pipes are fed by a force pump or bucket connected to the same by hose or pipe, to which a stop-cock or valve is connected for stopping off water from pressure pipe. Flow pipe or pipes run from the boiler to the circulating box, and also from circulating box pipes proceed for circulating the hot water, these are in stacks or ranges, which are connected with the flow pipe or pipes by a duct or chamber provided with valves, having knobs or handles outside, by turning some or all of which, some or all will be put in operation, and this entire or divisional action will be maintained as the case may be. The said duct or chamber I prefer being so made that the back part is separate from the other part of the duct or chamber, and that such back part is attached to the other part of the duct or chamber by screws and packing, or simply by caulking. The return pipe or pipes to the boiler is or are connected, as before stated, to the leg or legs, or dip parts, of the boiler, conveying the return water to the boiler. I arrange the stacks or ranges of hot water pipes in connection with duct or chamber, having valves so disposed that some or all of them may be turned on or off, and thus leave in operation, or shut off, some or all of the pipes. A boiler is preferred to be used of a dome-shape, and constructed so that stoke-holes and deep setting are dispensed with. The feed to the boiler and water circulation is effected by an arrangement of circulating box and pipes which communicate with heating pipes, and the return water from which pasees on to the boiler by return pipe by leg or dip part of boiler. Various accessory details are likewise described.

GOVERNMENT SCIENTIFIC EXPEDITION.

A valuable paper on the temperatures of the Sulu, Celebes, Banda, and China Seas, by Staff-Commander T. H. Tizard is appended to the Fourth Report of the Proceedings of the Challenger Expedition, and we give the following summary extracted from the *Athenæum*:—

The temperatures obtained in the seas partially enclosed by the Indian Archipelago prove that they have each of them deep basins cut off from the general oceanic circulation by ridges connecting the islands which surround them; for although in each sea soundings of over 2,000 fathoms were obtained, in no case did the temperature decrease with regularity from the surface to the bottom, as is usual in the open ocean; in every instance, after attaining a certain depth, the temperature below that depth remained the same.

The Temperature of the Sulu Sea.—The mean latitude of this sea is 8° N., and it has a greater minimum temperature than either of the seas in communication with it.

This minimum temperature, viz, 50·5 is invariably reached at a depth of 400 fathoms. In the China Sea this temperature is found at 200 fathoms, in the Celebes Sea at 180 fathoms, and in the Pacific Ocean, at 230 fathoms. It may, therefore, be inferred that the Sulu Sea is prevented from freely interchanging its waters with those of the China Sea by a ridge joining Borneo, Palawan, and the Philippine Islands, which does not exceed 200 fathoms in depth; that the ridge which joins Borneo with the Sulu Islands and Mindanao, does not exceed 180 fathoms in depth, and, that the ridge which separates the Sulu Sea from the Pacific does not exceed 230 fathoms in depth; for were there any deeper passages into the Sulu basin, the colder water of the surrrounding seas would certainly be forced into it.

The temperature of the upper portion of the water of this sea, from the surface to 400 fathoms, agrees in all three soundings, although taken at different seasons. The isotherm of 80° was found at 20 fathoms from the surface, that of 75° at 40 fathoms, 70° at 65 fathoms, and that of 65° at 90 fathoms from the surface, the isotherm of 60° and 55° not agreeing quite so well, being at 120 and 180 fathoms.

The Temperature of the Celebes Sea.—The mean latitude of this sea is 3° N., and the mean latitude of its opening into the Pacific Ocean, between the north-east point of Celebes and the south point of Mindanao is nearly the same, and as a temperature sounding was obtained close to the northward of this parallel in the Pacific, about 300 miles eastward of Talautse Islands, a good comparison between the temperature of the Celebes Sea and that part of the Pacific adjacent to it, can be made.

The minimum temperature of this sea is 38·5°, and it is found at the depth of 700 to 800 fathoms. This isotherm is found in both the Pacific Ocean and the Molucca passage, to a depth of 650 fathoms in positions immediately outside the channels which connect the Celebes Sea with their waters, and below that depth their temperature still decreases. It is, therefore, probable that there is a ridge of not more than 650 fathoms in depth running from the north-east point of Celebes through the Talautse group to the south point of Mindanao, which prevents the colder water of the Pacific penetrating into the deep basin of the Celebes Sea.

The temperature of the upper portion of this sea, from the surface to the depth of minimum temperature, appears to be constant, the isotherm of 80° being at 40 fathoms, of 75° at 70 fathoms, of 70° at 75 fathoms, of 65° at 100 fathoms, of 60° at 120 fathoms, of 55° at 140 fathoms, of 50° at 190 fathoms, and of 45° at 300 fathoms.

The Temperature of the Banda Sea.—Of three temperature soundings obtained in the Banda Sea, only one was of sufficient depth to ascertain that this sea also had an enclosed basin. The minimum temperature of this sounding was 37·5° which was found at a depth of 900 fathoms. This isotherm is found at a depth of 750 fathoms in the Molucca passage and the Pacific Ocean, and it may therefore be assumed that the depth of the ridge separating the basin of the Banda Sea from the Pacific does not exceed that depth.

The temperature of the water from the surface, to the depth of the minimum temperature, appears to be constant. The isotherm of 80° being at the depth of 22 fathoms, 75° at 50 fathoms, 70° at 80 fathoms, 65° at 100 fathoms, 60° at 130 fathoms, 55° at 165 fathoms, 50° at 200 fathoms, 45° at 300 fathoms, and of 40° at 600 fathoms. The specific gravity of the Celebes, Sulu, and Banda seas is less than in the Pacific Ocean on the surface; this may be accounted for by the excess of rainfall over evaporation in the area occupied by them.

The Temperature of the China Sea.—The results of the temperature soundings obtained in this sea appear somewhat perplexing, for while, as has been noticed, the temperatures of the Banda, Celebes, and Sulu seas appear to be nearly constant, those in the China Sea are not; those obtained in diverse localities differing greatly; but it must be borne in mind that the China Sea, which differs from the other seas enclosed by the Indian Archipelago in this respect, differs also in some other important particulars. Neither of those three seas has a large extent of shallow water, whereas nearly one half the area of the China Sea is under 100 fathoms in depth. Again, in each of those seas the mean latitude of the outlet into the ocean is nearly the same latitude of the sea itself; consequently, the water which they derive from the ocean is subject to nearly the same conditions. In the China Sea matters are very different, as, although its mean latitude is 11° N., the mean latitude of its outlet into the Pacific Ocean, between Luzon and Formosa, is 20½° north, and furthermore, the China Sea has, in the winter, a large range of surface temperature from 64° at Hong Kong to 84° at Singapore, whilst the surface temperature of the other three seas varies but slightly all the year round.

The change of the seasons also greatly affects the temperature of the China Sea, for whilst during the north-east monsoon, more particularly from the end of the year to the end of April the evaporation is greater than the rainfall, during the remainder of the year the rainfall is greatest. The total evaporation for the year at Manila was, in 1870, 23·7 inches greater than the rainfall, but in the first four months of that year it was 28 inches greater than the rainfall, showing that there must have been an excess of four inches of rain over evaporation during the remaining eight months. In 1871, the total evaporation was 32·5 inches greater than the rainfall, and in the first four months of that year, 45 inches greater, leaving 12·5 inches of rain in excess of the evaporation for the remainder of the year. The mean average rainfall at Manila is 95·36 inches.

This excess of evaporation over rainfall in the early part of the year, during the prevalence of the north-east monsoon, must also take place at Labuan and Hong Kong, as although the average total rainfall at Labuan is 115 inches per annum, only an average of 22 inches falls during the first four months, and at Hong Kong, where the average total rainfall per annum is 80·14 inches, 7·77 inches only fall at this period, and only 8.68 in five months; so that, looking to the small quantity of rain that falls in the first four months of the year, in proportion to the total fall, the evaporation all over the China Sea is in excess of the rainfall during the north-east monsoon and the contrary during the south-west monsoon.

The direction of the wind also assists in causing differences of temperature in this sea at different seasons of the year, for whilst during the north-east monsoon the surface water is forced by the wind into the China Sea from a higher and colder latitude than the mean latitude of this sea, in the south-west monsoon the surface water is forced out by the wind.

THE LAVATORIES COMPANY, LIMITED.

This is a company recently formed to provide for ladies, children, and gentlemen lavatories, retiring rooms, and waiting rooms all to have separate entrances. Such rooms, with which may be connected shops or stalls for the sale of useful articles for ladies, children, and gentlemen, will be opened in the principal thoroughfares of London, and eventually extended to the provinces. It is proposed to apply for the sanction of the Commissioners of Woods and Forests to the erection of suitable buildings in the various public parks, gardens, &c. The ladies rooms are to be under the entire superintendence of trustworthy matrons. Ladies and children only will be admitted to the ladies' rooms. The utmost care will be taken to render the establishments comfortable and strictly private. The most scrupulous cleanliness and order will be observed in every part of the premises. The fittings throughout to be of a superior and attractive description, and the charges will be moderate. Parcels will be taken care of and letters received at a small charge. Writing materials, newspapers, &c., will be supplied. Mr. John Innes, 9, Great Winchester-street, London, E.C., is the present secretary.

New Swimming Apparatus.—An invention, which will probably be of great assistance to those learning to swim, has been recently tried by the London Swimming Club. A wire is stretched along a swimming-bath, from which depends an india-rubber cord with a bandage at the end. The bandage is placed round the chest, and the cord fixed on a running wheel which travels along the wire as the swimmer progresses.

SPENCE'S SAFETY PIPE CONNECTION FOR SHIPS.

The present invention relates to improvements on the invention patented by Mr Spence, dated January 6th, 1872, No. 56, and consists in constructing not less than two strong boxes or wells of iron, or other suitable material fixed to the sides or bottom of the ship in any suitable position, and rendered perfectly water-tight.

The top or lid of each box or well is secured with bolts or nuts, with an elastic washer to render it perfectly water-tight, or rivetted on with access to the box provided by a properly constructed manhole. In the top of each box a brass or other suitable stuffing box is fixed, through which a rod passes up to the deck to work the main valves.

Valve arrangements of suitable form are secured to the ship's side inside the aforesaid boxes or wells, communicating with the outside by means of grated openings, such valve arrangements being opened and shut by the above-named rod.

One of the aforesaid boxes or wells contains the injection valve, and the other the blow-off valve. By these arrangements, the minimum amount is obtained (that can be advantageously adopted) of openings to the water in the ship's side or bottom, a matter of great importance for the safety of the ship.

TRADE MARKS.

One of the most important Acts of last session, in its bearings on commercial interests. is "The Trade Marks Registration Act," which comes into operation on 1st of January, 1876, and which compels the registering of all existing and future Trade Marks (or the rights of their proprietors cannot be preserved against infringement), at a Register Office, to be established in London. Mr. Goulden, of London, has forwarded us a synopsis of the Act, which appears to be a useful summary of it. We shall give a brief abstract of the Act at an early opportunity.

HOW TO MAKE THE MOST OF OUR FOOD.

It may truly be regarded as nothing short of a national calamity that the art of cookery is so little understood and appreciated in this country. The chief cause of this lamentable ignorance is that no great effort on a comprehensive scale has been made to educate the people into a realisation of the grievous loss they sustain through their ignorance in this respect, and at the same time to carry into their homes the knowledge that is wanting. When we reflect upon the fact that the inhabitants of other countries, from the superior knowledge they possess of how to prepare and cook their food, are able to live in comfort upon an income on which an Englishman would be unable to even support himself, it is high time that this ignorance should be dispelled. What would seem to be wanted is an inexpensive means of carrying into every household throughout the land a practical knowledge of how to make the most of every article of food. And we are hopeful that these means are at length forthcoming in a form that will command success. The publishers of that great educational encyclopædia, "The Popular Educator," have determined to issue the most thorough and complete compendium of cookery ever attempted, in the belief that such a work, being made the most comprehensive as well as (having regard to its contents) the cheapest ever issued, will find its way into the hands of the many hundreds of thousands whom it so closely concerns. At all events, the great experiment was commenced last month, as the first monthly part of "Cassell's Dictionary of Cookery" made its appearance on the 25th. We shall watch the progress of the work with much interest.

Poetry.

CHERISHED DAYS.

Those days are gone, and like a dream
Flit o'er my fancy now;
I woo them oft, though fades the gleam
That lit thy placid brow.
While on thy pictured face I gaze,—
So true, so fond, so fair;
A vision bright reveals those days,
As if thy soul were there!

Yes, they are gone! and like a dream
Flit o'er my fancy now;
I woo them oft, though fades the gleam
That lit thy placid brow.

E'en as the shadow shows the sun
Still shines, but not with thee!
Though in my heart thy light hath won
A jewel shed for me:—
Were time as true, thy pulsing heart
Would still her vigils keep!
Oh! dearer far to dwell apart,
Than leave but one to weep!

Those days are gone, and like a dream
Flit o'er my fancy now;
I woo them oft, though fades the gleam
That lit thy placid brow

Henry George Hellon.

APPLICATIONS FOR LETTERS PATENT.

(Continued from page 162.)

On August 16th.—2878 to 2887.—L. Kleinen. Machine for cleaning and preparing raw flax.—A. Sington. Compensating apparatus to be applied to steam-engine governors (com.)—R. O. Paterson and F. W. Brothers. Obtaining salts of ammonia.—C. J. Galloway and J. H. Beckwith. Apparatus for the manufacture and fixing of taper and flanged tubes for boilers.—J. T. Lockey. Apparatus for the evaporation of brine, water, and other liquids, and the furnaces to be used in connection therewith.—R. Handy. Processes for preparing cotton for spinning.—F. Wirth. Water-meters (com.)—J. Richards. Mandrels for bending metal pipe (com.)—W. Searle and R. Cook. Mode of and appliances for stamping, ornamenting, and shaping, or cutting out leather, textile fabrics, and other materials.—J. Braby. Machinery for distributing over the surface of land stable and farm yard manure, and other composts.

On August 17th.—2888 to 2902.—O. Packer. Double-slide box cocks.—W. Morgan-Brown. Machine for attaching heels to boots and shoes, and for trimming and fashioning the heels after they are attached (com.)—W. T. Deverell and B. T. Morton. Means and apparatus for obtaining motive-power in a floating vessel from the action of waves (partly com.)—W. Grune. Process to burn bituminous and mineral oils, as well as the products obtained from them, like paraffin, petroleum, naphtha, benzin, and other volatile hydro-carbonates, for heating and enlightening purposes.—W. Winter. Means or apparatus for retaining window blinds in any required position.—C. Carter. Bicycles.—J. Sawyer. Steam-boiler and other furnaces.—H. T. Broadhurst. Fancy weaving and the apparatus employed for such purposes.—G Green. Butter dish or receptacle for butter, sugar, marmalade, biscuits, or other table articles.—A. Sauvée. Construction of apparatuses for the concentration of sulphuric acid (com.) (Complete specification.)—C. Autier. Methods of and apparatus for washing clothes, linen, or other fabrics (com.)—W. R. Lake. Bustles and pads for ladies' dress (com.)—F. de Bowens Machine for making match-splints.—D. Biddle. Steering balloons.—G. Morton and J. Morton. Roller skates.

On August 18th.—2903 to 2918.—J. Imray. Rolling mills (com.) (Complete specification.)—M. F. Mason and G. Anderson. Machinery or apparatus for bottling and drawing off ales, wines, spirits, and other liquids.—H. A. F. Duckham. Gas regulators, more especially applicable for regulating the supply of gas to the burners of railway and tram carriages.—J. Edwards. Construction of railway coaches.—J. Gadsby. Apparatus for heating greenhouses, halls, shops, or other apartments or places.—

T. Abbott, T. Ainsworth, J. Ellis, and T. Helm. Dobby for looms for weaving.—W. Elliot. Propulsion of sailing vessels.—A. Pulbrook. Apparatus for enabling the passengers in a railway train in motion to communicate with the guard or engine driver. E. G. Brewer. Disinfectant (com.)—J. K. J. Foster. Apparatus and appliances for raising liquids and fluids, the same being applicable as auxiliary motive mechanism for various purposes.—W. E. Newton. Apparatus for dredging or excavating soil either under water or above ground (com.)—N. D. Benjumea. Means and apparatus for transmitting the human voice from one person to another —J. T. King. Implement for gathering fruit.—E. de Pass. Construction and arrangement of railway carriages and sleeping cars, and apparatus for lighting the same (com.)—A. J. Higham. Clocks and other timekeepers.—A. M. Clark. Bleaching vegetable fibrous substances (com.)

On August 19th.—2919 to 2926.—A. Billet. Automatical apparatus applicable to electric telegraphs for regulating their working.—T. B. Bishop. Sewing machine appliances (partly com.)—J. H. Johnson. Electric clocks or clock work (com.)—W. Morgan-Brown. Lubricating material consisting of solidified petroleum (com.) H. A. Oldershaw. Machinery for fitting and pasting the gussets and other parts of boots and shoes.—W. E. Gedge. Canteen, combining bed, tent, and other articles required by officers campaigning and others (com.)—E. Rabot. Smoke-consuming and inodorous furnaces for evaporating and incinerating alkaline lyes, molasses, distillers' wastes, &c.—W. J. Sykes. Means of and process for discharging and recovering oil or grease from fibres, yarn, or fabrics.

On August 20th.—2927 to 2941.—T. Fletcher. Gas and other furnaces.—J. Robey. Method of and apparatus for carbonising organic matters and for treating night soil to obtain useful products therefrom, also applicable to other purposes.—S. S. Hall and J. Hobson. Looms for weaving.—J. Steel. Drawing retorts and the machinery or apparatus employed therefor.—E. Tomlinson. Apparatus or apparatuses applicable to fire-places to facilitate the lighting, burning, and economising of fuel.— S. Discon. Lids or covers of chamber utensils, night commodes, water-closet seats, and the like for preventing the escape of effluvia.—R. W. Thompson and C. Lampitt. Machinery or apparatus for dressing flour, purifying middlings, and cleaning and separating grain —G. B. Dixwell. Steam engines. (Complete specification.)—M Dayral. Utilisation of woollen waste or shearings, and apparatus for the purpose (com.)—H. E. Newton. Apparatus for cooking alimentary substances (com.)—J. Toussaint. Construction or arrangements of mould cores used for casting pipes and analogous articles.—R. P. Williams. Manufacture of railway crossings.—J. Newman. Coverings for outside occupants of omnibuses, tram carriages, and such like.—J. Norris. Method of actuating or giving motion to washing machines and churns.—H. Wedekind. Apparatus employed in the manufacture of steel (com.)

On August 21st.—2942 to 2950.—J. Woods. Tile for kilns.—E. J. Jones. Apparatus for ageing or steaming woven or other web fabrics or yarns.—R. McL. Young. Sewing machine.—A. Montgomery, junr. Arrangement of the keys or manuals of organs, harmoniums, pianos, and other musical instruments.—C. A. Faure. Thermo-electric batteries and electro-motors.—J. E. Hanley. Construction of life-boats and other craft and steering apparatus.—A Barlow. Machinery for indicating the number of rotations or other movements per minute, or other portion of time, of shafts or other bodies. —J. T. Cardon. Machine for breaking and stripping hemp, flax, Indian grass, ramie, and other textiles.—G. S. Hooker. Washing machine.

On August 23rd.—2951 to 2261.—H. Chadwick and W. Jardine. Treating cupreous solutions obtained by Henderson's humid process or otherwise in order to purify the copper and utilise separated substances.—H. Brinsmead. Rotary screens.—N. King. Breech-loading fire-arms. (Complete specification.)—E. Smith. Self-acting catches or fasteners for securing the doors of railway carriages, waggons, or trucks, and other kinds of doors or gates.—John Wright. Safety apparatus for storing gunpowder and other explosive compounds.—W. J. Matthews. Apparatus for securing or tying scaffolding, timber, loaded waggons, or boats, and for other analogous uses.—I. B. Harris. Manufacture of indiarubber machine belting.—A. Arnold. Earrings.—W. March and R. Dalgliesh. Guarding and locking points for railways and apparatus therefor.—J. H. Johnson. Manufacture of manure and the apparatus employed therein (com.)—J. G. Tongue. Rotary steam, air, or gas engines (com.)

On August 24th.—2962 to 2973.—M. A. Soul. Combined bevel, square, protractor, slope-level, spirit-level, rule, compasses, and tool holder for screw-driver, awls, and other similar tools (com.)—E. Smith. "Dobby" for looms for weaving.—H. Newbolt. Apparatus for indicating the contents of casks, tanks, and vessels containing liquids and the quantities withdrawn therefrom.—C. S. Westcott. Machinery for making and composing types for printing.—J. W. Lee. Construction of pickers for looms for weaving.— J. Farrar, J. Farrar, and E. Farrar. Steam-boiler or other furnaces.—E. C. Lumby. Boilers for heating water for warming buildings and like uses.— F. X F. Heilborn. Fastenings for articles of dress and ornaments, and lockets and ornament suspenders.—E. Atkins. Solitaires, sleeve links, and other like articles.—S. Frith. Knitting machinery.—J. H. Johnson. Composition for protecting or preserving ships' bottoms and other submerged surfaces (com.)—W. R. Lake. Machinery for welding chain and other links (com.)

On August 25th.—2974 to 2987.—C. Crisp. Life-saving, swimming, and bathing garments.—W. T. C. Pratt. Apparatus for facilitating the coupling and uncoupling of railway carriages and trucks.—F. Field. Treatment of the solution of aniline colours for producing pigments therefrom.—T. Moy. Steam engines.—B. F. Stevens. Extension ladders (com.) — H. McKee. Balloons.—W. D. I. Foulkes. Cure of foot and mouth disease, foot rot, and similar disorders in cattle, sheep, and other animals (com.)—J. Whitley. Fabrics produced by lace machinery.--I. B Harris. Belt fasteners.—S. Edwards and H. Edwards. Manufacture of certain part of saddle tress, and apparatus to be used in the said manufacture.—J. Metcalfe, E. Hamer, and R. Metcalfe. Locomotive and other high pressure steam engines for economizing fuel.—W. R. Lake. Watches and similar time-keepers (com.) — J. Mallinson. Cocks, and sluice and valves to regulate the flow of steam, water, and other fluids.—G. T. Bousfield. Rifling fire-arms (com.)

On August 26th.—2988 to 3005.—S. Birley and E. Smythe. Producing locomotion in a vehicle by the bodily weight of the rider or riders in such vehicle, applied in accordance with the principle of gravity.—J. L. Dubois. Cocks or taps.—J. Fraser. Rotary engines —T. de Vall. Churns, partly applicable to other purposes.—W. E. Gedge. Boots and shoes with the object of combining warming apparatus therewith (com.)—A Williams. Optical instruments to be employed either for amusement or for useful purposes.—H. Beach. Taps known as high-pressure water-taps.—J. W. Elliott. Apparatus for cleaning table cutlery.—W. J. Kilner. Producing a continuous current of electricity by means of a rotating magnet or magnets, in combination with or without an apparatus for regulating the tension of the current.—A. M. Clark. Constructing iron ships or vessels (com.) (Complete specification.)—A. H. Robinson. Skates, [the steering of boats and other steering and guiding purposes.—B. N. Penrice. Rock tunnelling and shaft sinking, and machinery to be used for these purposes.—W. R. Lake. Knitting machinery (com.)—W. R. Lake. Traps for basins, sinks, and the like (com.)—J. Bullough and J. Smalley. Stopping motions applicable to machinery for preparing cotton and yarns and other fibrous substances.—H. Tatham. Manufacture of needles.—C. Blockmans and G. Chalet. Steam carriages for tramways and other roads.—W. F. Batho and J. T. Hanson. Apparatus for printing and stamping wall papers or other substances for decorative purposes.

On August 27th.—3006 to 3026.—J. McNish. Moulding pipes, columns, or cylinders, and apparatus therefor.—J. McMillan. Construction of ships or vessels.—W. Holland. Draw-bar couplings for railway vehicles.—C. Loader. Machines for gathering hay and corn, and loading the same on to waggons, and for making hay in the open field.—H. A. Bonneville. Manufacture of gas for lighting and heating, and the apparatus connected therewith (com.)—B. J. B. Mills. Safety apparatus applicable to cages used in the shafts of mines and hoists (com.)—J. J. Orphin. Snuff box or holder and snuff deliverer.—W. H. Hornsby. Packing for valves.—E. Whalley and E. Weild. Machinery for doubling, twisting, and winding.—H. B. Barlow. Manufacture of size called "Paremmentine" for preparing yarns, fabrics, and for other purposes (com.)—S. Kenyon. Treating iron wire with a new or improved composition for the purpose of protecting the same from the action of the atmosphere.—H. Thacker. Sheet metal boxes, pans, trays, and similar articles, and apparatus for manufacturing the same (com.) — H. A. Bonneville. Tobacco box (com.) — W. Weyhe. Motor engines worked by steam, air, gas, or other fluid, also applicable as pumps or blowing engines.—F. H. Maitrot. Articulated back-rest for invalids, specially applicable for beds —W. T. Patterson. Button-holes in linen or any light material, by the aid of a machine of simple construction.—A. M. Clark. Apparatus for measuring the human figure, and for setting out the patterns of garments, partly applicable to other purposes (com.)—H. Cherry. Machinery for lifting and lowering heavy bodies.—H. Tee. Apparatus for indicating and registering numbers, applicable to public conveyances, places of public entertainment and resort, and to analogous situations.—H. H. Withers and W. Wells. Reaping machines for binding the cut crop into sheaves. T. Green and J. H. Place. Churns and washing machines.

On August 28th.—3027 to 3036.—S. L. Coales. Latches, bolts, or other door fastenings.—G. A. Bridgett. Engines actuated by steam or compressed air for pumping and for other purposes.—J. P. Haslam. Construction of carding engines.—A. M. Clark. Apparatus for burning or revivifying and for otherwise treating bone-black or other substances, and apparatus for moulding or compressing sugar (com.) (Complete specification.)—F. Lazard. Manufacture of show cases, picture frames, beadings, and other articles, and apparatus employed therefor.—F. Wilkinson. Stop motions for machines for slubbing, roving, and weaving cotton, wool, and other fibrous materials.—J. Haythorne. Purifying the quality of iron in the puddling process —R. Duncan. Apparatus for pressing and moulding, especially useful for making bricks, roofing and flooring tiles, and clay pipes.—J. Lucas. Manufacture of lamps.—J. Hopkinson. Safety valves for steam boilers.

On August 30th.—3037 to 3045.—A. Dudgeon. Distillation of spirituous and other liquors and apparatus to be employed therefor. (Complete specification.)—G. Clark. Construction and rifling of guns and apparatus and appliances for loading and unloading the same, also applicable to small arms.—W. Palmer. Apparatus for railway trains to enable passengers to give an alarm to engine-driver and guard.—E. Heaton. Apparatus for punching or perforating boiler-plates and other metal plates.—A. McLaren. Saddle boilers for heating churches, conservatories, and other places.—T. Smith. Machinery for dressing, sifting, and feeding middlings, meal, and other similar substances.—J. Lynam. Manufacture of hard metallic compounds and their application in the manufacture of articles requiring extreme metallic hardness.—D. Drummond. Buffers for railway rolling stock.—R. McLintock and E. McLintock. Slippers and other like coverings for the feet.

On August 31st.—3046 to 3063.—A. M. Silber. Lamps.—C. Ezard. Construction of ash-pans for domestic fire-places.—L. Gosling and L. Gluckstein. Apparatus for lighting gaseliers or street lamps.—C. Cousins. Drums of rotary screens.—H. Loewenberg. Apparatus for coating fabrics with gelatinous compounds for the production of imitation leather, fabrics, wood, and other embossed or figured surfaces.—W. R. Nermінton. Manufacturing pianofortes to transpose the key-board keys and action one or more notes either above or below concert pitch.—A. C. Henderson. Combined blotting pad, paper weight, and writing case (com.)—I. Palling. Oil lamps.—J. B. Rowcliffe. Endless wires for paper-making machinery.—T. H. Paling. Window blind and curtain rollers (com.) (Complete specification.)—E. Anthony and W. W. Taylor. Printing machines, and apparatus connected therewith.—W. Adams. Machine or apparatus for cutting or quarrying stone or rock.—G. Pinnington. Pumps.—E. T. Hughes. Production of photoplastographs (com.)—J. Carter. Machinery for spinning, twisting, add doubling fibrous substances.—J. Snell. Mechanical arrangements for turning the leaves of music.—C. L. Light. Railway wheels, and methods of fastening tires on such wheels.—A. M. Clark. Device for clearing the vents or discharge pipes of wash basins and other similar receptacles (com.) (Complete specification.)

On September 1st.—3064 to 3078.—C. H. Sieber. Printing and dyeing (partly com.)—A. Beamish and C. Mason. Modes of and apparatus or means for preventing radiation of heat in steam boiler and other surfaces.—W. Crabtree and W. Hanson. Looms for weaving, and apparatus connected therewith. (Complete specification.)—W. P. Dando. Apparatus applied to gymnastic and theatrical performances.—C. Ezard. Construction of fire-bars for furnaces.—Capt. R. Burton. Fire-arms and projectiles.—W. R. Lake. Liquid-meters, which may also be used as pumps or motor engines (com.) (Complete specification. — W. J. Bayford. Hydraulic pumps and the action thereof.—C. C. Coleman. Machine and process for preparing ramie and other fibre from the plant stalks. (Complete specification.)—J. H. Ermatinger. Preserving fresh meat, game, fowl, fish, vegetables, butter (com.)—J. M. Napier. Embossing and stamping machines.—P. Gamboni. Motive power engines or apparatus. — R. Hodson. Apparatus for burning sawdust, shavings, and other combustible substances.—J. Elliott. Sewing machine needles.—E. G. Brewer. Safe time locks (com.)

On September 2nd.—3079 to 3087.—F. E. B. Beaumont. Apparatus for indicating and registering the speed of railway carriages and other vehicles.—W. Stark. New preliminary process to be undergone by skins and hides for tanning purposes (com.)—D. Tamet. Process for preserving bread for the use of travellers, the army and navy, and others (com.)—J. Milbourne. Machinery for pressing and ironing the seams and joints of woollen garments, hats, and other similar purposes.—T. Pearce. Fastenings for joining or uniting other belts or bands.—H. Wedekind. Furnaces (com.)—T. H. Richardson and A. Moffatt. Means of communication from passengers to guards and drivers of trains, and apparatus employed therefor.—E. Schonrock. Portable garments, and apparatus connected therewith, for saving life at sea and on other waters.—S. Pini. Mills.

On September 3rd.—3088 to 3098.—C. F. W. E. Dittmar. Explosive compounds and the manufacturing thereof. (Complete specification.)—D. Dow and J. Telfer. Obtaining free chlorine from chlorides.—J. Tenwick. Apparatus for the manufacture of malleable cast iron.—J. Edward. Apparatus for actuating the brakes of the rolling stock of railways.—H. Boden and S. Whitehurst. Means or apparatus for stopping or retarding carriages on rail or tramways.—W. Dalton. Lamps for the burning of petroleum and other oils and liquids.—R. Wilson. Apparatus for polishing the surfaces of pencil, pen-holders, and other similar articles.—T. H. Rees. Method of producing raised or sunken designs on sheet metal.—J. M. E. Daudot. Electric telegraph apparatus.—E. Brown. Apparatus for warming and ventilating railway carriages.—A. A. Hely. Food for cattle, partly adapted to human consumption.

On September 4th.—3099 to 3113.—D. Adamsom. Steam-engines.—T. F. Wallwork. Machinery for carding cotton.—E. Rowland. Construction of alarm signals to be used on railways and for other purposes.—H. Carter. Gas-fittings and burners.—E. Tyer. Means and apparatus for effecting communication in railway trains.—H. Ellis and J. Ellis. Power-travelling cranes or crabs.—W. Conquest. Machinery or apparatus for cutting and folding paper, specially applicable to machinery for printing on a continuous web (com.)—J. H. Roger. Highland cloak or cape or reversible sleeveless coat with cape.—J. A. A. Buchholz. Apparatus used for hulling, polishing, cleaning, separating and dressing grain and grain produce. — J. McPherson. Production or manufacture of ornamental fabrics applicable as trimmings for dress, furniture and other like purposes.—A. Waithman. Manufacture of twine or cord (Complete specification.) — J. C. Ramsden. Fabric composed either wholly or partly of metal.—D. Greig, J. Short, and J. G. Weeks. Air compressors.—R. Howarth. Steering apparatus.—G. W. Beyon. Machinery, apparatus, and tools for operating on metals and other materials and substances, and the mode of applying and working the same for the purpose of dressing, shaping, and finishing such materials.

On Septemper 6th.—3114 to 3126.—F. Holmes and W. S. Hopkinson. Machinery for cutting and splitting wood and other substances.—C. Campbell. Tension-regulator for the cords of window blinds.—C. le Sueur. Safety garments or floating vest.—A. A. Dixon. Injector for supplying water to boilers (com.)—B. J. B. Mills. Watches (com.)—W. Paton. Fabric for table mats or trays, mats or coverings for floors and other analogous purposes, and modes or apparatus for manufacturing the same.—E. G. Brewer. Mode or means for the preservation of alimentary substances (com.)—W. Griffiths and T. Griffiths. Method of and construction of apparatus for cleaning, polishing, and dusting tin and terne plates.—A. Browne. Method and apparatus applicable to pianofortes and music stands for turning over the leaves of music (com.)—J. Keats, A. Greenwood, and S. Wainwright. Manufacture of sewing thread and other cords, and machinery therefor.—G. T. Bousfield. Carpets and other fabrics (com.) (Complete specification.)—J. Y. Smith. Railway brake apparatus, partly applicable to other apparatus or machinery.—W. R. Lake. Hoes (com.)

On September 7th.—3127 to 3148.—A. Allen. Railway brakes.—R. J. Ellis. Tubular water circulating fire bars and connecting bearers for same.—E. F. Tompkins. Outdoor or indoor games.—H. E. Lester, junr., and G. Hallett. Steering apparatus.—G. Whyte. Mechanism for warning the engine-driver in the event of any of the carriages becoming separated from the engine, and for intercommunication between the passengers, guards, and engine-drivers.—A. Longsdon. Method of attaching and working guns, applicable to turrets, forts, shields, or other similar structures, and the carriages used in connection therewith (com.)—A. Longsdon. Construction of furnaces and apparatus connected therewith (com.)—A. Longsdon. Hydraulic brakes of gun carriages (com.)—S. Corbett. Ploughs or machines for raising or lifting potatoes, for cleaning or forking land, and for ploughing and pulverising land and sowing seed.—G. Edmonds and E. Edmonds. Manufacture of swivels and watch keys.—W. Young. Obtaining hydro-carbon vapours from gases, and the apparatus employed therefor.—B. J. Thomson and T. Connolly. Protecting ships or vessels and other submerged or partially submerged vessels.—H. Kellogg. Process for leatherising paper, cloth, or any fibrous material.—E. Firth. Washing machines.—J. Copley and W. Jennings. Machinery to be used for dyeing, scouring, bleaching, and manufacturing animal and vegetable tissues and fibres, and for obtaining products from such tissues and fibres.—W. R. Lake. Grates for steam boiler and other furnaces and fire boxes (com.)—W. R. Lake. Engine to be operated by steam, hot air, or water, and which may also be used as a pump or a fluid meter (com.)—J. L. McKim. Single and compound rotary steam engines.—L. Heinrichs. Sewing machines for sewing straw plait and other materials (com.)—J. C. Hurcombe. Umbrellas and parasols, and cases or sheaths for the same.—J. Curtze. Stoves.—A. M. Clark. Anti-friction machinery bearings (com.)

On Septtmber 8th.—3149 to 3162.—A. Longsdon. Construction of railway and other wheels (com.)—T. Christy, junr. Construction of furnaces with a rotary inclined hearth or pan for the puddling of iron and the fusion of steel (com) C. D. Abel. Cranes (com.)—D. Cargill. Ventilating, and preventing fires on board ships, and apparatus employed therefor.—D. Dow and J. Telfer. Obtaining oxide of manganese from the chloride, also applicable for manufacturing nitrates of the alkalies, and for obtaining free chlorine from chlorides.—J. A. King and J. Little. Furnaces or tanks used in the manufacture of glass.—F. Ratcliff and W. H. Ratcliff. Heating of annealing and melting pots.—H. E. Newton. Construction of toys (com.)—J. Grave. Water closets.—H. Chancellor. Slide valves.—O. Stenberg. Caloric engines.—J. Shuttleworth. Crank-arms.—J. Butterworth, W. Dickinson, and C. Catlow. Looms for weaving.—A. M. Clark. Treating sewage and other impure or polluted waters (com.)

On September 9th.—3163 to 3170.—W. Barnicoat. Construction of levelling instruments.—W. Spence. Manufacture of varnish, oils, dryers, and similar articles, and apparatus for the same (com.)—J. Ellis. Apparatus for lubricating the axles and wheels of waggons, corves, carriages, and other vehicles.—D. Porteous and J. Ormerod. Apparatus for sizing yarns or warps.—R. Newton. Apparatus for supplying fuel to steam boiler and other furnaces.—T. H. Dale. Hydropathic garments to be used for acting upon the skin and bringing it into proper working order.—T. Hampton. Looking glass movements for controlling the swinging of looking glasses. — J. H. Johnson. Motive power engines (com.)

On September 10th.—3171 to 3182.—W. Tranter. Breech-loading guns and pistols. — H. H. Murdoch. Mitrailleur (com.)—S. James. Apparatus, and the arrangement of parts constituting same, used for heating and mixing the materials employed in the manufacture of artificial fuel.—B. Looker. Heating apparatus.—T. W. Roberts. Construction of submarine tunnels.—J. A. Mills. Furnaces for the prevention of smoke and economy of fuel.—W. Harpham, T. C. Harpham, and W. Thomson. Process for treating and separating the hair or wool from hides and skins, and for preserving the same without injury to the hides and skins.—J. Borland. Hydro-carbon furnaces and means for producing light and heat (com.)—W. L. Wise. Apparatus for purifying illuminating gas (com.)—N. D. Spartali. Construction of screw propellers.—W. Clissold. Mode of and apparatus for ornamenting the handles of walking-sticks, or the sticks of umbrellas, parasols, and other analogous articles. — C. Thomas. Means of and apparatus for raising or floating sunken vessels or other heavy bodies or materials.

On September 11th.—3183 to 3196.—J. Pearson. Fastenings for solitaires, sleeve links, shirt and other studs, purses, bags, and other like articles.—W. E. Gedge. Skates (com.)—J. Guéneux and E. Normand. Mode of making coloured impressions on tin plate and other metals.—S. Perkins and J. Clark. Dressing cases and other boxes or cases.—J. Rogers. Galvanic shield or protector for imparting electricity to the chest and lungs and other parts of the human body.—A. F. Shanks. Water-closets, urinals, cisterns, baths, valves, and other apparatus in which water is consumed, contained, conveyed, or controlled.—W. A. Comber. Ratchet braces, which are also applicable in converting motive power from reciprocating to intermittent rotary motion.—W. Clissold. Rotary cutters for cutting or ornamenting wood, bone, ivory, and other hard substances.—O. Schimmel. Roving and fine spinning frame for spinning carded wool.—F. Prestage. Manufacture of bricks and tiles, and the machinery or apparatus employed therein.—A. Montgomery. Arrangement of the keys or manuals of organs, harmoniums, pianos, and other musical instruments.—J. R. Wright. Hardening and tempering umbrella rib wire, either solid or paragon.—W. L. Wise. Machinery or apparatus for making plaits or folds (com.)—W. R. Lake. Instruments for measuring angles (com.)

On September 13th.—3197 to 3208.—J. G. Williams. Manufacture of iron and steel and articles therefrom.—W. Buckley. Apparatus for heating feed water for steam-boilers and other purposes.—W. Williams. Laying and joining pipes and tubes for tunnels, water and gas pipes, pneumatic tubes, and similar purposes.—T. Radmayne. Kitchen ranges.—T. Hyatt. Architectural and engineering constructions, including modes, methods, processes, and materials for carrying the same into effect.—M. A. J. de la C. des Roseaux. Lubricators and oil feeders.—M. Pa s and M. D. Pass. Machinery or apparatus for disintegrating or pulverising.—J. C. Scott. Machines for moulding, cutting, and setting out toothed wheels. — W. H. Spencer. Manufacture of illuminating gas.—T. Harrison. Pavement for roadways.—W. L. Wise. Machinery or apparatus for making plaits or folds (com.)—W. R. Lake. Sewing machines (com.) (Complete specification.)

On September 14th.—3209 to 3218.—J. S. Crossland. Non-condensing steam-engines.—D. C. Gillett. Means for raising sunken vessels, applicable also for other purposes.—J. M. Holmes. Machine or apparatus for compressing scrap metal, metallic filings, and other metallic waste, preparatory to remelting the same (com.)—H. Van Dyk. Reticules, travelling bags, jewel cases, dressing cases, work boxes, and other similar receptacles.—T. Wrench. Umbrellas. —W. C. S. Percy. Apparatus for coupling and uncoupling railway carriages, and for retarding and stopping them, also for depositing explosive signals on railway rails.—H. L. Bellini. Ceilings for theatres or halls and other like buildings.—W. E. Gedge. Horse shoe (com.)—W. R. Lake. Blasting powder (com.)—F. F. Butlock. Looms (com.)

On September 15th.—3219 to 3232.—J. Wolstenholme, T. Partington, and W. Partington. Shuttles for weaving.—J. W. Whitaker. Apparatus for charging gas retorts.—F. W. Crossley and W. J. Crossley. Gas motor engines.—A. D. Turner. Means of fixing and securing articles in boxes or cases, specially applicable to sewing machines. —W. M. Scott. Breech-loading small arms.—J. H. Johnson. For the preparation of the staves of casks, tubs, and other like receptacles (com.)—A. Hughes. Apparatus to be used in collecting and tying corn and other crops into sheaves or bundles.—L. M. Detenre. Imitation steel ornaments and jewelry.—L. M. Detenre. Imitation jewelry set with stones.—J. Burley. Machinery for cutting the pile of fustians and other pile fabrics.—A M. Clark. Preparing cotton for spinning, and machinery for same (com. (—A. M. Clark. Seed drills (com.) (Complete pecification.)—A. M. Clark. Machinery for rolling crimping tacks, awls, and other articles (com.) (Complete specification.)—B.-M. Siégris. Apparatus for communication between the different portions of railway trains.

On September 16th.—3233 to 3246.—E. A Cowper. Tunnelling machinery.—G. Morand Wiring and binding hat and bonnet shapes, and the machinery or apparatus employed therefor. —J. F. M. Pollock. Machinery or apparatus for making bricks, and for other purposes.—R. H. W. Dunlop. Apparatus for aiding human locomotion in the water.—J. Adams. Charging vessels or receivers with condensed or liquefied gas, in liberating the same therefrom, and in the means employed therefor.—E. Smith. Snap or fastener for bracelets, necklets, and other ornamental and useful articles.—Major Hon. J. Colborne and Capt. C. B. St. George. Apparatus for obtaining and applying motive power.—A. M. Clark. Cylinder printing machines (com.) —E. G. Colton. Skates.—H. Bland. Apparatus or means for ensuring the more efficient, economical, and safer working of railways.—E. P. Alexander. Magneto-electric machines and electro-motive engines (com.)—W. R. Lake. Machine and process for compressing and reducing steel ingots, iron piles, and the like (com.) (Complete specification).—S. Johnston. Harvesting machines.—F. W. Schreiber. Apparatus for capsuling bottles and similar articles.

On September 17th.—3247 to 3262.—F. G. Fleury Water meters or apparatus for measuring the flow of liquids or fluids.—S. S. Lewis and A. Copie. Soap.—E. Grether. Card-cloth or foundation material for use in the manufacture of the cards employed in the carding of textile materials and fabrics.—E. de Ewer and H. Bloomfield. Apparatus employed for generating and supplying lighting gas produced from hydrocarbon oils.—N. D. Spartali. Steam engines in general, and more particularly to high pressure steam engines.—J. T. Kinder and E. C. Kinder. Sign or lamp especially applicable to tobacconists.—W. P. Ingham and A. C. Hill. Machinery for making clay retorts and other similar articles from clay.—W. Morgan-Brown. Ammoniacal salts (com.)—J. H. Johnson. Salts (com.)—I. S. McDougall. Furnaces or fire places and apparatus connected therewith.—Sl. Roberts and Sr. Roberts. Driving straps or belts and picking arms.—C. Judkins. Regulating the supply of gas to gas burners.—W. D. Butler. Capped button lock.—G. T. Soley. Self-sealing cover or lid for gas and other retorts, manholes, ships' side lights, fire extincteurs, vaults, sugar filters, and vessels for containing gases, chemicals, fruits, and other liquids and substances (com.)—J. E. Ransome and G. Ling. Lawn mowers.—H. Y. D. Scott. Treatment of phosphates of iron and alumina, and obtaining useful products therefrom.

On September 18th.—3263 to 3282.—L. Fremion and A. Lazon. Fire escapes, applicable for other purposes.—A. N. Porteous and G. C. Bruce. Propelling tramway cars and other vehicles.—W. McKenzie and R. E. Donovan. Ornamental and compound soaps.—R. Eaton and J. Eaton. Machinery or apparatus for stretching hat bodies.—S. Turner, jun., J. Turner, and R. Turner. Securing the joints of steam and water pipes, &c.—E. Shepherd, F. Rothwell, J. E. Hough, and T. Rothwell. Sewing machine shuttles.—E. Field. Pumping machinery.—C. Holme. Holder and fastener for tickets, cards, and labels.—R. Bevan. Obtaining and applying motive power.—A. Shaw. Garden syringes.—J. Q. Dunstan. Strainers for pump suction pipes and other pipes and apertures.—Q. L. Brin. Obtaining and applying motive power.—W. R. Lake. Wheels for wheeled vehicles (com.) Complete specification.—J. A. Brae. Pumps, applicable to engines driven by steam or other fluid. —J. T. Glossop. Railway rolling stock.—W. S. Squire. Manufacture of Nordhausen oil of vitriol.—H. Turner. Marine and other steam engines on the high and low pressure compound principle.—J. H. Johnson. Apparatus for sewing boots and shoes (com.)—J. McNab. Getting or mining coals or minerals, and drilling and blasting or disintegrating rocks, and machinery and apparatus employed therein.—T. R. Crampton. Manufacture of iron and steel, and apparatus employed therein.

On September 20th.—3283 to 3294.—T. Wrigley. Arrangement of apparatus for supporting persons in the water whilst learning to swim, the application of which may also be employed for other similar and useful purposes.—J. Amory. Apparatus for effecting combustion of smoke, and heating feed-water for boilers.—J. B. Bunyard. Combined table and print-case or portfolio.—J. Simpson. Paddle-wheels.—J. N. Rowe. Pumps.—F. W. Follows, J. Bate, and J. Lawrence. Machines for cutting the edges of grass, applicable also to knife-cleaning machines.—H. Kellogg. Springs for corsets, bed-bottoms, and other purposes.—J. G. Tongue. Manufacture of vegetable leather, and application thereof to various useful purposes (com.)—J. G. Tongue. Machinery for stitching books and other fabrics, partly applicable to other purposes (com.)—J. Marshall. Locomotive and other steam boilers, and furnaces and apparatus connected therewith.—G. J. Symons. Magnetic compasses.—W. R. Lake. Process and apparatus for generating and purifying ozone (com.)

On September 21st.—3295 to 3308.—W. H. Pellow. Self-dumping horse rakes (com.)—J. Gill, H. Wainwright, and W. Gill. Lubricating the spindles of machinery employed in spinning, twisting, slubbing, and roving wool, cotton, silk, flax, and other fibres.—J. T. King. Valves for blowing and air-compressing engines (com.)—W. Clark. Boilers for locomotive engines, and similar tubular boilers. J. Kidd. Vapour gas generators and burners.—H. Harpin. Bricks and the machinery or apparatus for making the same.—F. Weston. Apparatus connected with increasing the illuminating power of coal gas.—T. Temple. Method of working railway safety appliances, without the expenditure of time and labour in coupling or connecting the parts together from carriage to carriage, being self-coupling and disconnecting.—A. P. Bell and T. Thorp. Apparatus for lighting gas automatically.—H. Fisher. Foundry drying stoves, for drying moulds and other articles.—J. I. Thornycroft.—Pumping machinery actuated by steam or other fluid.—W. Kempe. Raising the nap upon cloths and fabrics, and apparatus employed therein.—E. H. C. Monckton. Manufacture and annealing and novel applications of glass, and the means and apparatus for effecting the same. (Complete specification.)—J. Tench. Tuning-key for pianofortes and harps.

On September 22nd.—3309 to 3318.—C. Stewart. Means of signalling or communicating between the passengers, drivers, and guards of railway trains.—J. Woolcott. Apparatus for gathering apples and other fruit from the ground.—H. B. Fox. Stoppering bottles or other receptacles containing liquids, whether gaseous, aerated, or otherwise.—J. Atkinson. Mortising by power.—J. S. Gaine, F. Dixon, and W. Rockliffe. Composition for coating the bottoms of ships, also applicable for coating structures of metal, stone, or wood, especially where it is desirable to protect such structures from the action of water, the ravages of worms, the growth of plants and mollusca.—J. Burrows and H. Flint. Apparatus for tipping coal and other minerals.—P. Jensen. Navigation of the air, and apparatus therefor (com.)—W. E. Bartrum. Rotary engines, pumps, or meters (partly com.)—J. Imray. Gas-producing furnaces for boilers (com.)—W. R. Lake. Application of flexible bands or hoops to bales or packages, and to the construction of buckles therefor (com.) (Complete specification.)

On September 23rd.—3319 to 3333.—W. Reid. Apparatus to be used in connection with various processes of treating yarns with liquids.—A. Weigel. Production of certain colouring matters.—J. G. Weir and A. C. Morgan. Signalling apparatus for railways.—C. A. Terrey. Rock drilling or boring machinery.—D. Clark. Warping yarns or threads, and the machinery or apparatus employed therefor.—T. C. Sorby. Apparatus for the fastening of windows.—I. A. Timmis. Construction of springs for railway and other vehicles (com.)—F. E. Saxby. Valves to be used for the purpose of regulating the supply of steam, compressed air, or water to engines or machines driven by either of the above force.—J. E. Sedden and C. Ellis. Construction of dry ash closets.—S. Knowles and J. Kay. Apparatus for drying, stretching, steaming, and ageing woven fabrics, and for drying fibrous materials and other substances.—A. Barker. Brushes, brooms, mops, street cleaners, and other similar articles.—S. Aldred. Railway sleepers.—W. Baker. Roller or wheel skates.—G. Gibbs. Method of stoppering bottles intended to contain effervescing liquid.—J. Ascough. Manufacture of brooms and brushes and apparatus or machinery to be employed therein.

On September 24th.—3334 to 3353.—W. T. Sugg. Apparatus for indicating the illuminating power of gas.—W. A. Gilbee. Apparatus for signalling on railways (com.)—E. W. T. Jones. Means for utilizing certain material produced in the process of galvanizing iron.—J. Reynolds. Tuyeres for smiths' forges or smiths' hearths.—J. N. Lessware. Manufacture of glucose or grape sugar, and obtaining infusions and extracts for brewing and other purposes.—J. C. A. Rode. Stoves.—J. C. Fuller and G. Fuller. Galvanic battery, applicable to telegraphic and other purposes.—E. P. H. Vaughan, F.C.S. Alarm apparatus for steam and other pressure gauges (com.)—R. Smith. Machinery for doubling and winding cotton and other yarns and threads.—C. D. Norton and J. G. Lyle. Method of telegraphic communication by an hydraulic or pneumatic apparatus.—J. R. Turnock. Method of converting reciprocal into continuous rotary motion, especially applicable to steam and water power engines and treadle machines.—H. G. Whiting. Medical appliances for the cure or relief of nervous and other diseases.—C. Schuchardt and E. Broedel. Locks and springs for locks.—J. J. Kennedy. Means or apparatus to be employed as a protection for the operative when cleaning and painting windows and buildings, which may also be employed as a sun blind, a fire escape, and for scaffolding, and for other useful purposes.—F. Gendebien. Steam motor for tramways and other railroads.—G. Glossop, Steam hammers.—E. A. Cowper. Glass furnaces.—J. S. Lowe. Apparatus for taking the votes of electors at parliamentary, municipal, and other elections.—R. Slingsby. Construction of photographic studios.—S. R. Smyth. Manufacture and manipulation of iron, steel, and other metals, and the apparatus employed therein.

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